Proposed Mining Plan and Transportation Corridor Plan, La Plata Mine, San Juan County, New Mexico

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Environmental Impact
Statement OSM-EIS-17

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OFFICE OF SURFACE MINING
Reclamation and Enforcement
BROOKS TOWERS
1020 15TH STREET
DENVER, COLORADO 80202

OCT 23 1984

To all interested parties:

The enclosed draft environmental impact statement (EIS) has been prepared by the Office of Surface Mining Reclamation and Enforcement (OSM) and is available for public review and comment. This EIS analyzes the impacts on the human environment that would result from approval of the mining plan and issuance of a Federal permit to mine coal by OSM for San Juan Coal Company's proposed La Plata mine.

The comment period for this EIS will extend until 4:00 p.m. (mountain time) on January 4, 1985. **Written comments** should be hand-delivered or mailed to the following address: Allen D. Klein, Administrator, Attn: Charles M. Albrecht, Office of Surface Mining Reclamation and Enforcement, Western Technical Center, Brooks Towers, 1020 -15th Street, Denver, Colorado 80202.

Written comments should be as specific as possible. OSM appreciates all comments, but those most useful and likely to influence decisions in the preparation of the final EIS are those which provide facts and analyses to support any recommendations or conclusions. OSM cannot assure that written comments will be considered or included in the preparation of the final EIS if they are received after the close of the comment period or at locations other than the address given above.

A **public hearing** on the EIS will be held on December 4, 1984, at 7 p.m., at the La Plata Volunteer Fire Station, La Plata, New Mexico.

Filing of a written statement by commenters at the time of the hearing is requested and will greatly assist the transcriber. Submission of written statements in advance of the hearing will allow OSM officials to prepare appropriate questions, which could be asked to clarify or to elicit more specific information from the person commenting. The public hearing will continue until all persons who are present in the audience and wish to comment have been heard. Commenters will be limited to 10 minutes of oral testimony per person.

For further information and additional copies of this draft EIS, contact Charles M. Albrecht, Chief, Environmental Analysis Branch, Western Technical Center, at the above address or by telephone (303-844-5656).

Sincerely,

Richard E. Dawes
for Allen D. Klein
Administrator
Western Technical Center

Enclosure

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U.S. Department of the Interior
Office of Surface Mining Reclamation and Enforcement

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Draft Environmental Impact Statement
OSM-EIS-17

September 1984

Type of Action: Administrative

Prepared by the
U.S. Office of Surface Mining Reclamation and Enforcement
in cooperation with the
Bureau of Indian Affairs
Bureau of Land Management
New Mexico Mining and Minerals Division

John D. Ward
Acting Director

Bureau of Land Management
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COVER SHEET

Proposed action: Approval of a mining plan and a transportation corridor plan submitted by San Juan Coal Company (SJCC) for the La Plata mine, and issuance of a Federal permit to mine coal.

Type of statement: Draft environmental impact statement (EIS)

Lead agency: Office of Surface Mining Reclamation and Enforcement

Cooperating agencies:
Federal:
  Bureau of Indian Affairs
  Bureau of Land Management
State of New Mexico:
  Mining and Minerals Division

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Abstract: San Juan Coal Company (SJCC) proposes to mine an average of about 2.0 million tons per year or 69.7 million tons of coal over 32 years at its La Plata mine. In the process, 1,551 acres of land would be disturbed on the mine area, the facilities area, and the transportation corridor addressed by SJCC's permit application package. An additional 92 acres would be disturbed during construction of that part of the transportation corridor within the permit area of the San Juan mine. Total disturbance, therefore, would be 1,643 acres. The Black Diamond, Navajo, and San Juan mines are in operation in the general area. The proposed La Plata mine, in conjunction with these other mines, would moderately impact the social and economic conditions of the city of Farmington and of San Juan County, New Mexico. In addition, activities at the proposed mine and within the proposed transportation corridor would significantly impact the mine-site and the corridor themselves as well as two grazing leases. Other impacts would be moderate or negligible.

Comments regarding this draft EIS must be received by: January 4, 1985

Please retain your copy of this draft EIS. Unless the extent of public comment is such as to require that it be commensurately revised, the **final EIS** is anticipated to be a **supplement** to this draft statement. Copies of the final EIS will be sent only to those agencies and organizations listed in chapter V, to those who comment on this draft EIS, and to those who specifically request a copy of the final EIS.

PREFACE

San Juan Coal Company (SJCC) proposes to open the La Plata surface coal mine in the San Juan Basin of New Mexico. SJCC has submitted a detailed permit application package (PAP) for this mine to the Office of Surface Mining Reclamation and Enforcement (OSM) and the New Mexico Mining and Minerals Division (MMD). Both agencies, and the Bureau of Land Management (BLM), have identified portions of the PAP that must be modified or clarified for the mining plan and the transportation corridor plan to meet Federal and State requirements. Conditions that would bring the plans into full compliance with Federal and State regulations would likely be incorporated into the permit and rights-of-way by OSM and New Mexico MMD, and BLM, respectively.

Chapter I of this environmental impact statement (EIS) describes the proposed Federal action on SJCC's mining and transportation corridor plans and the purpose of and need for this action; it also provides background information. Chapter II identifies and compares the range of action alternatives available to the decisionmaker on these plans. Chapter III describes the existing environment that would be affected by the proposed action. Chapter IV analyzes and describes the impacts that would result from the proposed action.

Chapter V lists those government agencies and private organizations from which comments are being solicited. Chapter VI lists, with their qualifications, the individuals who prepared this document and/or the environmental analyses in it. Chapter VII lists references cited in this document.

We invite you to review this draft EIS, especially its conclusions, carefully. Your suggested corrections will be considered, and substantive comments addressed, in the final EIS.

SUMMARY

This environmental impact statement (EIS) analyzes the impact on the human environment that would result from (1) approval of a mining plan and a transportation corridor plan, (2) issuance of a Federal permit to mine coal by the Office of Surface Mining Reclamation and Enforcement (OSM) for San Juan Coal Company's (SJCC's) proposed La Plata mine, and (3) issuance of a right-of-way for the off-lease coal-haul road and the facilities area by the Bureau of Land Management. The Bureau of Indian Affairs must approve the right-of-way for that part of the transportation corridor that would cross the Ute Mountain Indian Reservation. This right-of-way has been issued by the Ute Indian Tribe. An analysis of SJCC's permit application package (PAP) is also being prepared by the New Mexico Mining and Minerals Division (MMD) to determine SJCC's compliance with the New Mexico Surface Mining Act, with the provisions of which any permit issued must comply. New Mexico MMD is the New Mexico State agency responsible to issue a State permit for both the mine and the transportation corridor.

SJCC has submitted a PAP for approval of its mining plan and issuance of a Federal permit to mine coal in accordance with the requirements of the Mineral Leasing Act of 1920, as amended (30 USC 181 et seq.), the Surface Mining Control and Reclamation Act of 1977 (30 USC 1201 et seq.), the State of New Mexico's cooperative agreement, and regulations implementing the New Mexico Surface Mining Act. Because SJCC has fulfilled the requirements of its leases and has filed a complete PAP with OSM, a decision by the Secretary of the Interior regarding approval of both the mining and transportation corridor plans and issuance of a Federal permit is required by law. This draft EIS analyzes three alternative decisions, or "actions," the Secretary could take. These actions are: approval of the mining and transportation corridor plans, with conditions to bring them into full compliance with State and Federal regulations, and issuance of a Federal permit to mine coal (alternative A); disapproval of the plans, in which case no Federal permit would be issued (alternative B); or no action (alternative C). Because the Secretary must make a decision on this application, OSM has found alternative C to be not reasonable. OSM has chosen alternative A as its "preferred alternative."

Brief description of the proposal

SJCC proposes to open the La Plata surface coal mine in the northern San Juan Basin, San Juan County, New Mexico, 18 miles north of Farmington. The permit area, comprising 2,559 acres of gently rolling topography, is used for ranching and wildlife. SJCC would extract 70 million short tons of low-sulfur subbituminous coal during 32 years and, in the process, would disturb 1,643 acres. The average annual production rate would be 2 million tons, with a peak production of 4 million tons per year. A description of the proposed mine is presented in appendix A.

Summary of impacts

OSM's analysis indicates that, while the proposed La Plata mine would have major impacts upon geology, soils, and vegetation on the minesite, within the transportation corridor, and on two grazing leases, its impact on these resources in the entire northern San Juan Basin would be comparatively minor. OSM also concludes that the proposed mine would have moderate impacts upon air quality, ground water, wildlife, land use, transportation, recreation, and socioeconomics at or near the minesite. Most of the impacts would be short-term in that they would disappear once mining ceases and reclamation is completed. In the context of the northern portion of the basin, all other impacts from mining would be minor, even when considered cumulatively with those from the other existing or proposed mines in the area.

Moreover, the proposed mine would not interfere with the future usability of the region's renewable resources. About 71,138 tons of coal would be mined per acre, threatened or endangered species are absent from the permit area, and energy growth is generally accepted by the residents of the area. Therefore, the environmental impacts of mining the 70 million tons of coal could not likely be appreciably lessened by using a different method of mining or by mining elsewhere.

Following is a brief summary of the impacts that would occur if the mine and transportation corridor are developed as proposed:

- During mining, the overburden, soils, and vegetation on as much as 1,011 acres of the minesite would be disturbed or progressively excavated. Changes in stratigraphy would be permanent. Soil structure would be radically changed but would re-form over time. The vegetative productivity and the use of the proposed minesite (currently, livestock grazing and wildlife) should be restored to premining levels following reclamation. Although vegetation would support a land use similar to that before mining, postmining vegetation would be somewhat different from the existing vegetation. The proposed mine would operate in a winter mule deer range and so would remove part of that range from mule deer use. Although there would be a loss of wildlife during mining, wildlife populations would utilize the reclaimed land. The species composition and abundance would depend on the success of habitat and vegetation restoration. The lowered ground-water levels resulting from mining of the coal aquifers and from pumping water from a deeper aquifer would still be noticeable 30 years after mining ceases and may take 70 to 100 years to return to premining conditions. About 27 acre-feet a year of ground water would be diverted from the La Plata valley to the back-filled pits until the spoil becomes saturated. The quality of the ground water in the replaced overburden would not be as good as at present (roughly 1,000 to 3,300 milligrams per liter (mg/L) total dissolved solids (TDS)), but would still be acceptable for anticipated postmining agriculture and wildlife uses (3,000 to 5,000 mg/L TDS). SJCC would be required to replace any developed water supply affected by its mining.

- Despite some degradation of air quality in the vicinity of the proposed mine, the quality of the air would still meet Federal and State standards. Traffic to and from the mine would cause and encounter short delays, increase the noise level, and add to maintenance requirements of the roads.

- By 2006, the proposed mine would contribute about 760 persons to the population increases in San Juan County resulting from energy development. Such population increases would place a demand on the county governments and the cities of Farmington and Aztec to provide services, such as police, fire, water supply, waste disposal, health, and recreation.

- Mining and associated facilities would constitute a visual intrusion to the generally rural landscape during the construction and active mining phases. This intrusion would be, for the most part, local, in that the proposed minesite would not be visible from State Highway 170 and would be away from major viewing areas. Construction and operation of the proposed transportation corridor across the La Plata valley would create a more apparent visual intrusion as well as increasing the noise impacts. The facilities would be removed during reclamation and the area returned to natural conditions.

If the mining and transportation corridor plans were not approved and a Federal permit were not issued, the adverse environmental impacts associated with the approval alternative would not occur. Any mining or other resource uses needed to meet energy demands would occur elsewhere. State and local governments would not receive the 50-percent share of Federal coal royalties. An estimated 780 direct and indirect jobs would not develop.

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CHAPTER I

INTRODUCTION

The proposed Federal action analyzed in this draft environmental impact statement (EIS) is approval of the mining plan and the transportation corridor plan submitted by San Juan Coal Company (SJCC) for the proposed La Plata mine, issuance of a Federal permit to mine coal by the Office of Surface Mining Reclamation and Enforcement (OSM), and issuance of rights-of-way for the facilities area and transportation corridor by the Bureau of Land Management (BLM). The Bureau of Indian Affairs (BIA) must approve the right-of-way for that portion of the transportation corridor that would cross the Ute Mountain Indian Reservation. This right-of-way has been issued by the Ute Indian Tribe. Conditions would likely be incorporated into the Federal permit by OSM, BLM, and the New Mexico Mining and Minerals Division (MMD). New Mexico MMD is the New Mexico State agency responsible to issue a State permit for both the mine and the transportation corridor. These conditions could be necessary to bring the mining and transportation corridor plans into full compliance with the Permanent Regulatory Program of OSM and the New Mexico Surface Mining Act, carrying out the Surface Mining Control and Reclamation Act of 1977 (SMCRA), conditions of the Federal coal leases, and all other applicable Federal laws. Copies of SJCC's permit application package (PAP), which contains the plans, and of the supporting data can be reviewed by the public at the OSM Western Technical Center, Brooks Towers, 1020 -15th Street, Denver, Colorado; OSM Albuquerque Field Office, 219 Central Avenue NW, Albuquerque, New Mexico; New Mexico Mining and Minerals Division, 525 Camino de los Marquez, Santa Fe, New Mexico; and the San Juan County Clerk's Office, San Juan County Courthouse, Aztec, New Mexico.

A. NEED FOR FEDERAL DECISION

SJCC holds a Federal coal lease in the northern San Juan Basin. It has met all terms of the lease and has submitted a complete PAP to mine the coal. Therefore, the Secretary of the Interior is required to make a decision on the mining and transportation corridor plans. This EIS analyzes the environmental consequences of the alternative decisions, or "actions," available to the Secretary.

SMCRA authorizes the regulatory authority to issue permits for a term of up to 5 years, with certain exceptions. SMCRA further provides the right of successive permit renewal in 5-year increments for the coal mining operations area covered by the permit. The permit area is defined in the applicant's PAP and includes all areas where surface mining and reclamation operations would occur. It includes the actual area mined and the area disturbed by associated surface facilities and haul roads.

B. SCOPE OF THE ANALYSIS

OSM has prepared this EIS to analyze the environmental impacts of the proposed Federal action. The technical information on which this analysis is based is contained in the PAP. The impacts discussed focus on the proposed permit area, facilities area, and transportation corridor, and include direct impacts from mining, offsite impacts caused by mining, such as changes in hydrologic conditions and air quality, and other impacts, primarily social and economic, resulting from increased employment and economic activity.

Analyses of impacts from the proposed facilities area and transportation corridor, which are outside the lease area, are included here as partial bases for the cumulative analysis of the proposed La Plata mine impacts. Analyses of the transportation corridor and an alternative facilities area were furnished by the Bureau of Land Management (BLM).

The potential need for coal is not addressed in this EIS. When the lease was originally issued, the need for coal was assumed. SJCC now holds a valid lease. Therefore, OSM is constrained to evaluate the proposed mine and its associated transportation corridor on the basis of what impacts they would have on the environment.

C. APPLICANT'S PROPOSAL

SJCC's lease is approximately 18 miles north of Farmington, in San Juan County, New Mexico (fig. I-1). The northern border of the eastern part of the lease is along the New Mexico-Colorado State line.

In SJCC's PAP, the proposed mining operation at La Plata is addressed in terms of three distinct features: the mine, the facilities area, and the transportation corridor. In the impact analyses that follow in this EIS, these three features, singly or combined together, form impact areas, which are defined as follows:

- The mine area (2,310 acres): that part of the two leases that is included within the permit boundary.
- The permit area (2,559 acres): the mine area and that part of the proposed facilities area adjacent to the mine area.
- The mine study area (3,191 acres): the mine area, the proposed facilities area, and the transportation corridor.

The mine study area consists of 3,191 acres of rolling to sharply dissected surface and is used for livestock grazing, wildlife habitat, and natural gas production and distribution; it includes 2,310 acres for mining, 249 acres for the proposed facilities area, and 632 acres for the proposed transportation corridor. BLM must issue a right-of-way to SJCC for both the proposed facilities area and the transportation corridor. SJCC has agreed to minimize the acreage disturbed within this right-of-way. Therefore, after construction of the roads and facilities, SJCC would relinquish to BLM's control all unneeded acreage within the right-of-way. Table I-1 compares the acreages of the mine study area, the permit area, and the area to be disturbed by mining, and gives the surface and coal ownership acreages in the permit area. Figure I-2 shows the surface ownership of the permit and proposed facilities areas and that portion of the proposed transportation corridor that would extend from the facilities area across the La Plata River; figure I-3 shows the coal ownership in the permit area.

SJCC proposes to mine approximately 69.7 million short tons of low-sulfur, subbituminous coal from four seams in the Fruitland Formation. A total of 1,643 acres would be disturbed, 1,011 acres for the mine area, 505 acres for the proposed

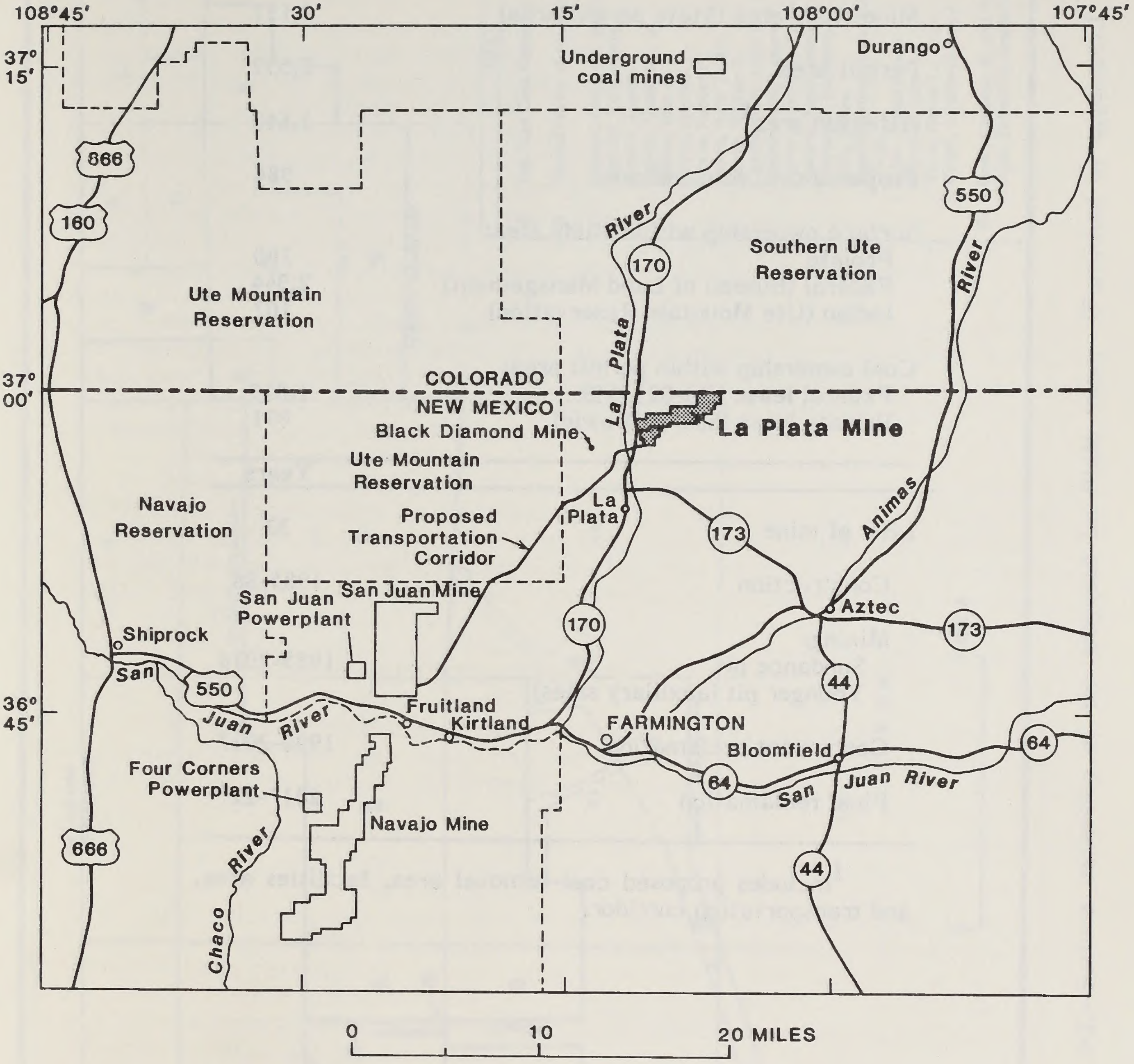

Figure I-1.--Location of the proposed La Plata mine.

Table I-1.--Data for the proposed La Plata mine

	Acres involved
Mine study area (State permit area)	3,191
Permit area	2,559
Affected area[1]	1,643
Proposed coal removal area	984
Surface ownership within study area:	
Private	740
Federal (Bureau of Land Management)	2,344
Indian (Ute Mountain Reservation)	107
Coal ownership within permit area:	
Federal lease NM-0315559	1,819
Private lease (SJCC; Bowie)	491
	Years
Life of mine	32
Construction	1985-86
Mining:	
Sundance pit	1985-2016
Younger pit (auxiliary sales)	
Concurrent reclamation	1990-2017
Final reclamation	2017-22

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[1] Includes proposed coal removal area, facilities area, and transportation corridor.

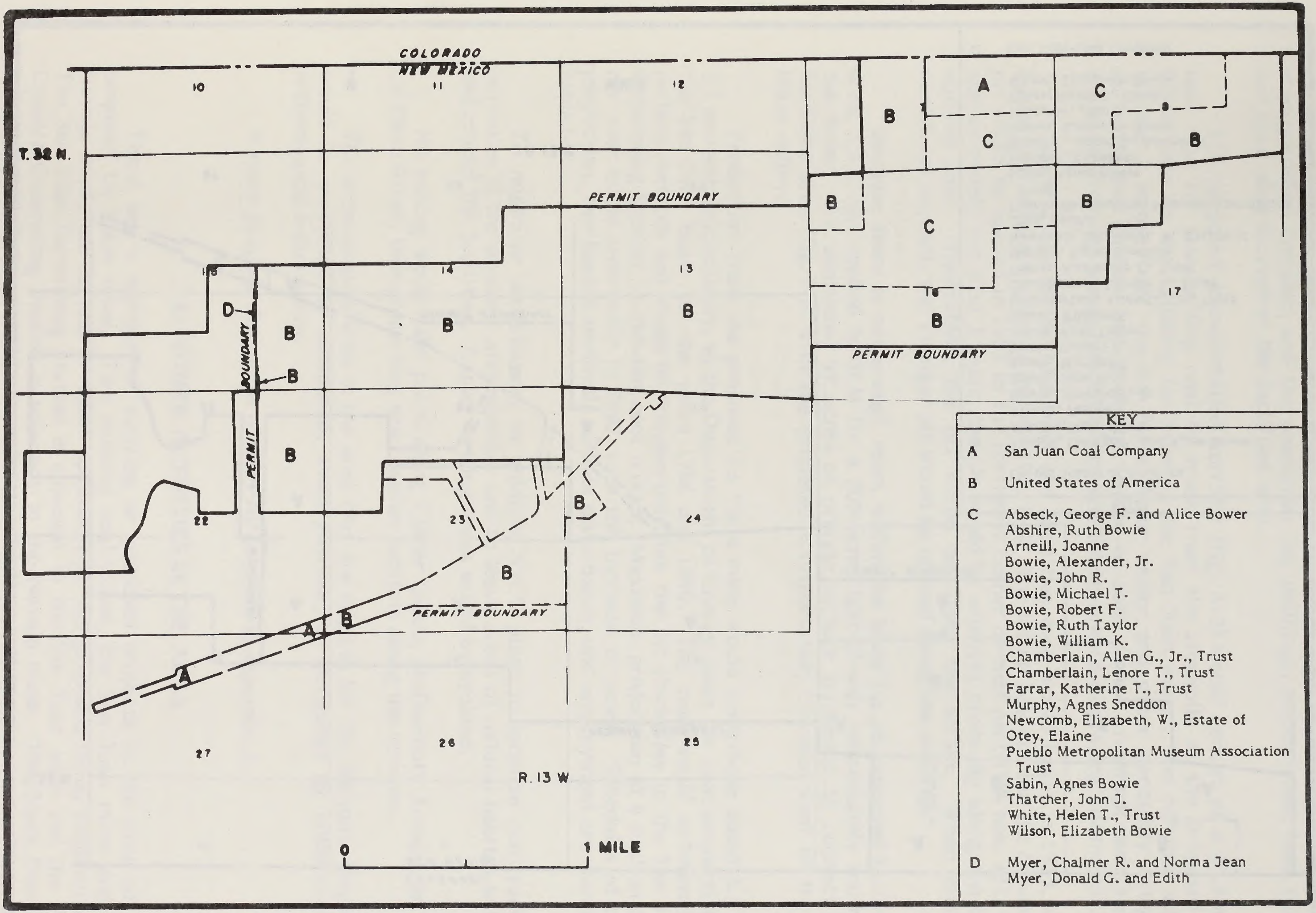

Figure I-2.--Surface ownership of the proposed La Plata mine. (Furnished by applicant.)

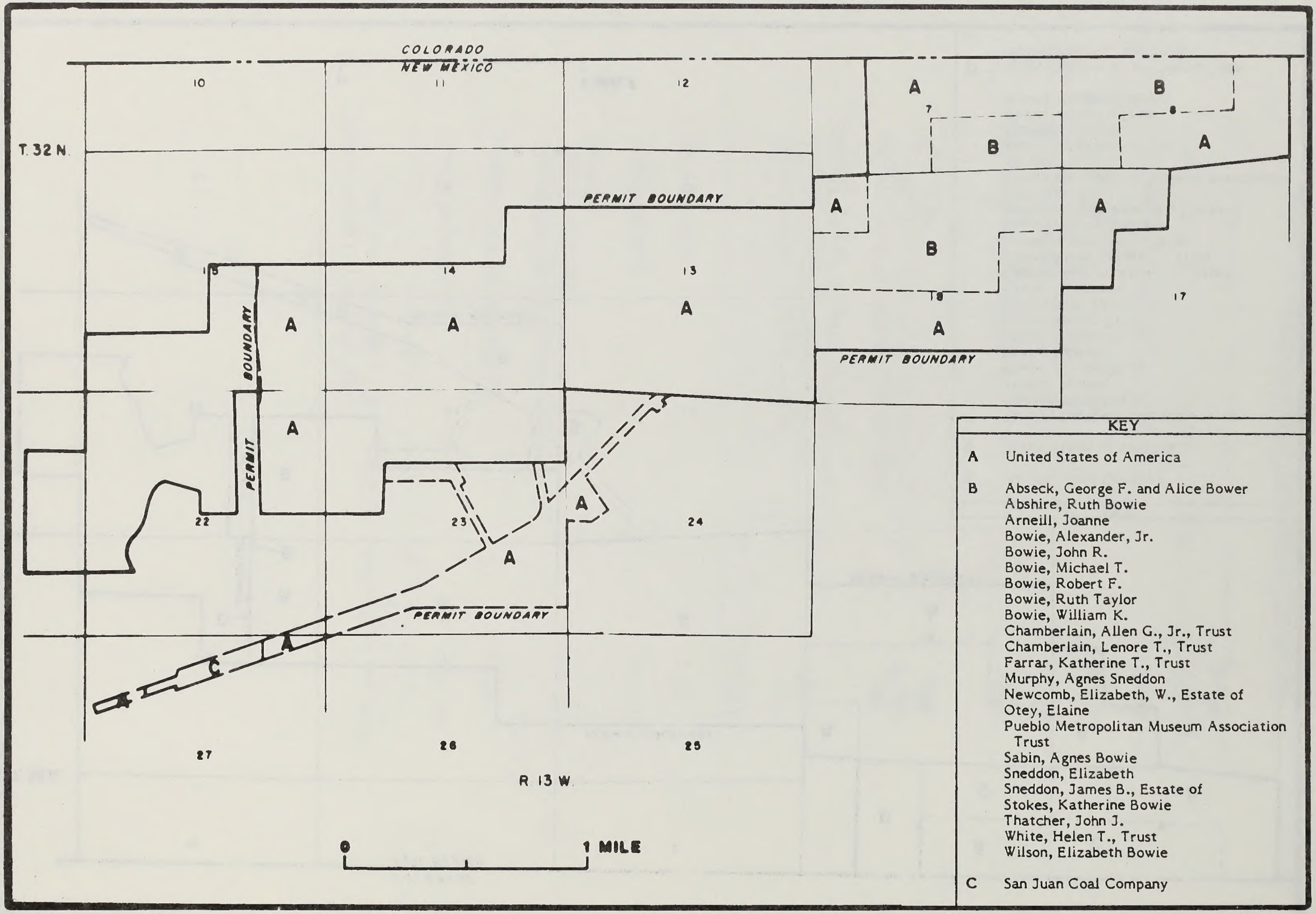

Figure I-3.--Coal ownership of the proposed La Plata mine. (Furnished by applicant.)

transportation corridor, and the remainder for buildings, access road, haul roads, and spoil piles located on the facilities area.

The proposed transportation corridor (fig. A-3) would consist of a 20.5-mile haul road for transporting coal by truck from the stockpile at the proposed La Plata mine to the crushing facilities at the San Juan mine. The corridor would include a bridge over the La Plata River valley and other necessary bridges, culverts, and ditches, and would be fenced on both sides. Livestock underpasses would be provided where needed to prevent the severance of grazing allotments.

Construction of the haul road and facilities area would begin in 1985, with initial coal mining beginning in 1986 (fig. I-4). The initial box cut for the Sundance pit would be opened in 1985 in the northeast corner of that pit (NW¼ sec. 13). For approximately the first 5 years, the pit would be oriented cross-dip along the coal outcrop line. Thereafter, the pit would be along the strike. When market conditions warrant, the Younger pit would be opened along the outcrop.

Because there is not enough room within the lease for its proposed facilities area, SJCC has applied to BLM for a 200-acre right-of-way immediately south of the lease. An additional 49 acres of private surface is needed to connect the facilities area (fig. I-5) with the proposed transportation corridor west of the La Plata valley.

Production from the proposed La Plata mine would contribute about 3.5 and 2.1 percent, respectively, to the Department of Energy goals for coal production in the San Juan Basin for the years 1986 and 1990. The coal would be mined by surface methods and would be transported from the pit stockpiles to the San Juan Generating Station by 140-ton coal trucks. Maximum production of 4 million tons per year would first occur in 2007 with the increase of sales. Schedules of coal production, overburden removal, surface disturbance, and employment are shown in table I-2.

To minimize disturbances to wildlife, SJCC plans to localize construction activities to the smallest area possible and to leave areas of natural habitat within and around the facilities. Raptor nesting areas would be avoided.

No mining would take place along Cinder Gulch, McDermott Arroyo, or the La Plata River, thus preserving any riparian habitats along the streams.

The archeological sites in the area that are eligible for the National Register would be protected by avoidance, when possible, or mitigated by collection of archeological information.

A more detailed discussion of the PAP is given in appendix A.

D. OTHER ACTIVITIES IN THE AREA

There are a number of existing or proposed projects in the area of the proposed La Plata mine. Two existing coal mines, the San Juan mine and the Navajo mine, are 20 and 24 miles southwest of the proposed mine, respectively. The San Juan Generating Station is adjacent to the San Juan mine and the Four Corners Generating Station is adjacent to the Navajo mine. The Black Diamond mine, next to the proposed haul road about 2 miles southwest of the La Plata site,

Table I-2.--Projected coal production, surface disturbance, and employment, proposed La Plata mine

(Data furnished by applicant)

Year of operation	Coal production (million tons)	Area affected (acres)	Overburden removed (million bank cubic yards)	Area reclaimed (acres)	Average number of trucks loaded per week[1]	Total employees (salaried and operations)[2]
1985	0	[3]659.24	0	0		
1986	0.60	155.07	2.054	0	171	250
1987	1.50	30.62	2.630	0	214	150
1988	1.50	60.28	3.018	0	214	150
1989	1.50	27.63	3.304	0	214	150
1990	1.50	37.39	3.055	7.77	214	150
1991	1.50	30.21	3.237	27.64	214	150
1992	1.50	13.69	3.683	8.95	214	150
1993	1.50	22.39	3.916	10.82	214	150
1994	1.50	26.74	4.128	14.49	214	150
1995	1.50	18.97	3.957	11.88	214	150
1996	1.50	23.91	4.192	14.13	214	150
1997	1.50	41.11	3.759	10.47	214	150
1998	1.50	22.44	3.791	10.92	214	150
1999	1.50	23.39	4.088	14.82	214	150
2000	1.50	60.12	4.060	6.10	214	150
2001	1.50	---	4.371	---	214	150
2002	1.50	---	4.585	---	214	150
2003	1.50	[4]196.36	4.701	[4]12.95	214	150
2004	1.50	---	3.698	---	214	150
2005	1.50	---	2.895	---	214	150
2006	1.50	---	3.284	---	214	150
2007	4.00	---	12.928	---	571	400
2008	4.00	[5]93.05	14.737	[5]69.24	571	400
2009	4.00	---	15.825	---	571	400
2010	3.70	---	15.472	---	529	400
2011	3.70	---	14.186	---	529	400
2012	3.70	---	12.820	---	529	400
2013	3.70	[6]100.39	14.144	[6]183.68	529	400
2014	3.40	---	13.563	---	486	400
2015	3.40	---	16.007	---	486	400
2016	2.75	0	13.640	---	393	400
2017	2.75	0	16.699	---	393	400
2018	0	0	0	---	0	10
2019	0	0	0	[7]1,239.14	0	10
2020	0	0	0	---	0	10
2021	0	0	0	---	0	10
2022	0	0	0	---	0	10
Total	69.70	1,643	236.427	1,643		

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[1] Assumes 140-ton trucks.
[2] Includes both construction and mine employees.
[3] Transportation corridor and facilities area.
[4] Total for period 2001 to 2005.
[5] Total for period 2006 to 2010.
[6] Total for period 2011 to 2015.
[7] Total for period 2016 to 2022.

Figure I-4.--Mining progression for the proposed La Plata mine. (Furnished by applicant.)

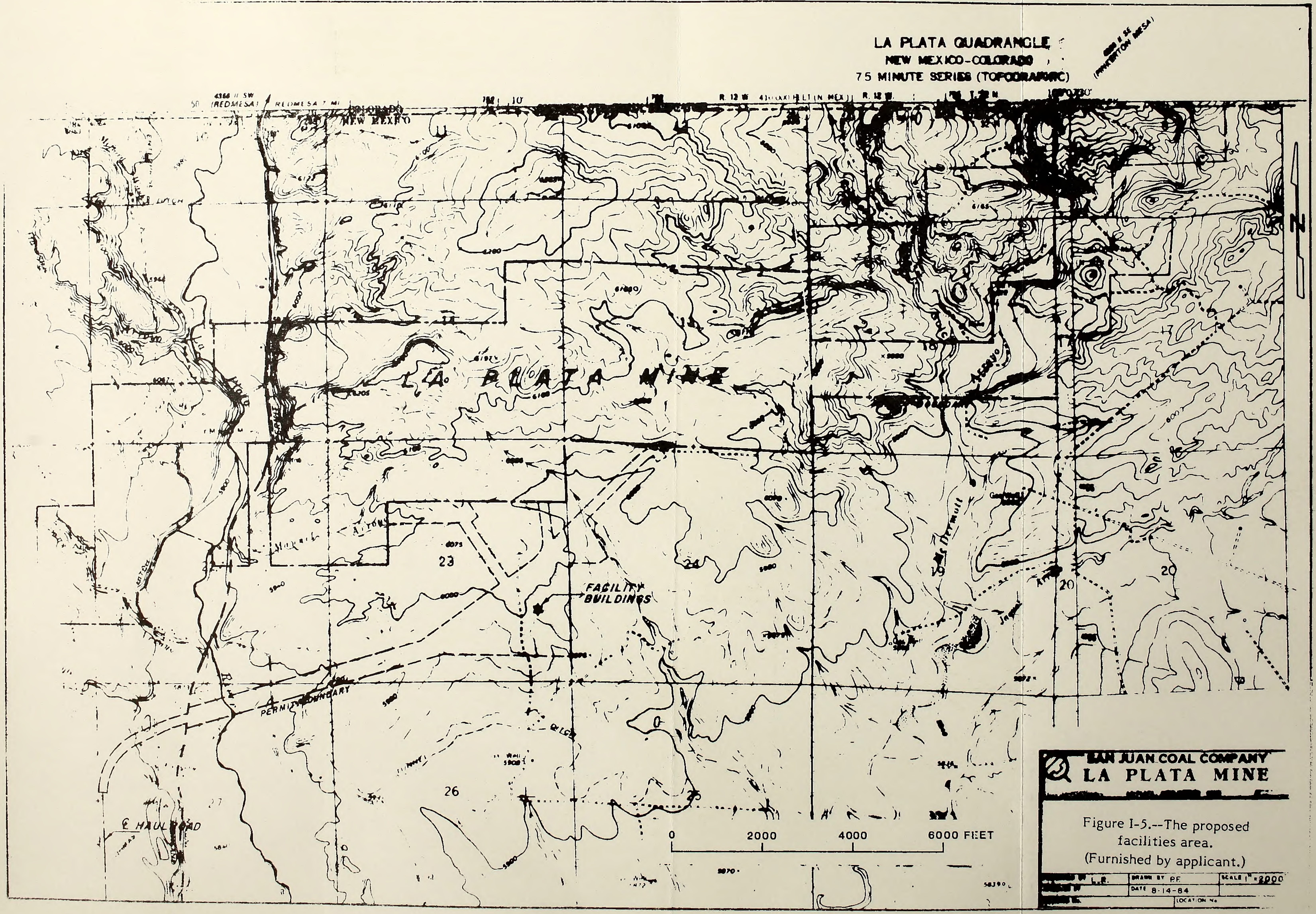

Figure I-5.--The proposed facilities area. (Furnished by applicant.)

is currently mining humate. Three or four small underground coal mines are active about 15 miles north in Colorado. Two 200-acre coal tracts 2 to 3 miles southwest of the site have been proposed for leasing by BLM in its regional coal-leasing EIS (Bureau of Land Management, 1984).

The Bureau of Reclamation plans, as part of its Animas-La Plata Project (Bureau of Reclamation, 1980), to construct the Southern Ute Dam and Reservoir on Cinder Gulch at the northern boundary of the permit area. The New Mexico Irrigation Canal was proposed to extend from the dam west-southwesterly through the permit area. Several pipelines, which would form part of the irrigation distribution system, are proposed to cross the haul road. (See appendix E.)

The earliest possible date for construction of the Animas-La Plata Project to start is 1986, depending on approval of funds by Congress. The Southern Ute Dam, the New Mexico Irrigation Canal, and associated features would probably be built 5 to 7 years after funding for the project is first approved. The final alinement of these features would depend on the status of reclamation of the La Plata mine and would be negotiated with SJCC (C. I. Barrett, Regional Director, Bureau of Reclamation, written communication, August 16, 1984).

Four existing irrigation ditches in the La Plata valley, the Indian Ditch, the Highland Park Ditch, the Hillside Ditch, and the Greenhorn Ditch, would be crossed by the proposed haul road.

The proposed La Plata minesite is within the Barker Dome gas field. There are two gas wells on the north permit boundary, and several gas pipelines through the permit area together with many miles of access roads. Shell Oil's new carbon dioxide pipeline passes through the area just north of the proposed facilities area but south of the mine area. Natural gas development will continue throughout the area. Prior right would determine which company would incur the cost of relocating any pipelines that would interfere with coal mining.

CHAPTER II

ALTERNATIVES

This EIS evaluates three alternative actions that cover the range of decisions available to the Secretary of the Interior regarding the mining plan and the transportation corridor plan for SJCC's proposed La Plata mine. The first alternative available to the Secretary (alternative A) is approval of the plans, with conditions to bring them into compliance with Federal and State regulations, and issuance of a Federal permit to mine coal; OSM has chosen alternative A as its "preferred alternative." The second alternative available to the Secretary is alternative B, disapproval of the plans, in which case no Federal permit to mine coal would be issued. The third alternative is the no-action alternative.

In addition to these three alternatives, OSM evaluated other alternatives (including underground mining, lease exchange, and delaying approval) that it found not to be reasonable. Underground mining would greatly reduce the recovery of the coal resource, would create additional safety problems, and would result in undesirable subsidence conditions. At present, neither a lease exchange for another tract nor further restrictions to the development of the permit area is indicated. Delaying approval is more properly considered during leasing because of the due diligence clause in the lease; delaying would not reduce impacts because the coal would have to be mined elsewhere to meet contractual obligations. There is no evidence that delaying approval would help the local communities meet socioeconomic impacts. Other alternatives to the development of coal resources in the San Juan Basin have been previously analyzed in the regional analysis portion of the EIS's prepared by BLM (Bureau of Land Management, 1979a, 1984).

Development of alternative energy sources and energy conservation are more appropriate for consideration on a national rather than a site-specific basis. These evaluations have been made in the final EIS on the Federal Coal Management Program (Bureau of Land Management, 1979b). Any new alternatives discovered in course of review will be carefully considered.

A. COMPARISON OF ACTION ALTERNATIVES

Alternative A: Approval of the plans.--Under alternative A, SJCC's mining and transportation corridor plans (summarized in chapter I and appendix A of this EIS) could be approved subject to conditions necessary to bring them into full compliance with the State of New Mexico Surface Mining Act, the requirements of SMCRA, the conditions of the lease, and all other applicable Federal laws (such as the Federal Land Policy and Management Act; the Mineral Leasing Act of 1920, as amended; the Endangered Species Act; NEPA; the Archeological and Historic Preservation Act; the National Antiquities Act; the Clean Air Act; and the Clean Water Act).

If, in the course of mining and reclamation, SJCC then met these conditions (listed in appendix B), as well as those in the BLM right-of-way grant and those already committed to in its PAP, its La Plata surface coal mining operation would comply with the requirements both of the New Mexico Surface Mining Act and of SMCRA, and cumulative environmental impacts would be mitigated.

Environmental impacts that would occur if alternative A is approved are described in chapter IV. The impact analyses are based on the assumption that the additional requirements (appendix B) would be met by SJCC.

BLM must issue a right-of-way to the applicant for use of public lands that are not part of its leasehold. Construction of the proposed facilities area and the portion of the transportation corridor that would cross public land would thus require a BLM-issued right-of-way. The Ute Mountain Indian Tribe has already issued a right-of-way to the applicant for use of that portion of the transportation corridor that would cross the reservation. BIA is responsible for approval of the right-of-way crossing the reservation. BLM would be responsible for any necessary changes in grazing permits or grazing-allotment boundaries resulting from coal-mining operations.

Alternative B: Disapproval of the plans.--Under alternative B, 70 million tons of coal would not be mined and a peak construction workforce of about 250 and a peak permanent workforce of about 400 would not be employed at the mine. Those environmental impacts of mining discussed in chapter IV would not occur at the proposed La Plata mine.

If the mining and transportation corridor plans are not approved, SJCC would not receive any return on its investment in studying the La Plata minesite, in preparing a PAP, and in applying for the necessary permits. State and local governments would not receive a 50-percent share of the Federal coal royalties from mining, which have been estimated to average $3.2 million per year. Because the coal from the proposed La Plata mine is committed to the San Juan Generating Station, coal to meet this commitment would have to be mined somewhere other than at the proposed minesite, but probably still within the San Juan Basin.

Alternative C: No action.--The no-action alternative was evaluated by OSM and was determined not to be reasonable because SJCC has fulfilled the requirements of its lease and has filed a complete PAP with OSM. Therefore, a decision by the Secretary regarding approval of the mining and transportation corridor plans and issuance of a Federal permit is required by law. However, the impacts to the human environment of implementing the no-action alternative would be the same as those of implementing alternative B. For the purposes of this EIS, these alternatives are considered equivalent and the no-action alternative is not analyzed further in this document.

B. TECHNICAL ALTERNATIVE TO THE PROPOSED FACILITIES AREA

In response to the concerns of a landowner in the La Plata valley, BLM evaluated an alternative facilities area (with associated roads). Table II-1 compares the proposed facilities area, shown in figure I-5, and the alternative facilities area, shown in figure II-1, and shows that the alternative area would cause greater environmental impacts than would the proposed area.

A conveyor system for transporting coal across the La Plata valley was evaluated but was not considered to be reasonable because of (1) changes in the production rates over the life of the mine and (2) economic considerations.

Table II-1.--Comparison of SJCC's proposed and the alternative facilities areas

	Proposed	Alternative
Total acreage	249	225
Private acreage	49	98
Percentage increase in private acreage	Base.	103
Federal acreage	200	127
Percentage increase in Federal acreage	Base.	-37
Private land crossed	Utah International, Inc.	Utah International, Inc. D. M. Thomas W. H. Thomas D. H. Rothlisberger E. L. Rothlisberger Mrs. J. F. Loehr
Length of haul road in La Plata Valley (feet)	2,200	2,900
Safety concerns	One road crossing.	Four road crossings.
Potential for surface runoff from haul road	Negligible.	Moderate.
Archeological impact	Moderate.	Extreme.
Distance of homes affected from haul-road portion of facilities area (feet)	D. M. Thomas (215)	D. H. Rothlisberger (325) G. D. Robinson (425) Mrs. J. F. Loehr (450) J. W. Stanley (600) H. J. Stoltenberg (700) L. Ston (700) E. Thomas (800)

Table II-1.--Comparison of SJCC's proposed and the alternative facilities areas--Continued

	Proposed	Alternative
Distance between highway and building complex (miles)	1.3	0.3
Distance of homes affected from nearest building/ facility	Fincher (1.1 miles)	Ludlum (450 feet) Fincher (750 feet) McArthur (900 feet)
Visibility of building complex from State Highway 170	None.	High.
Noise levels	Low.	High.

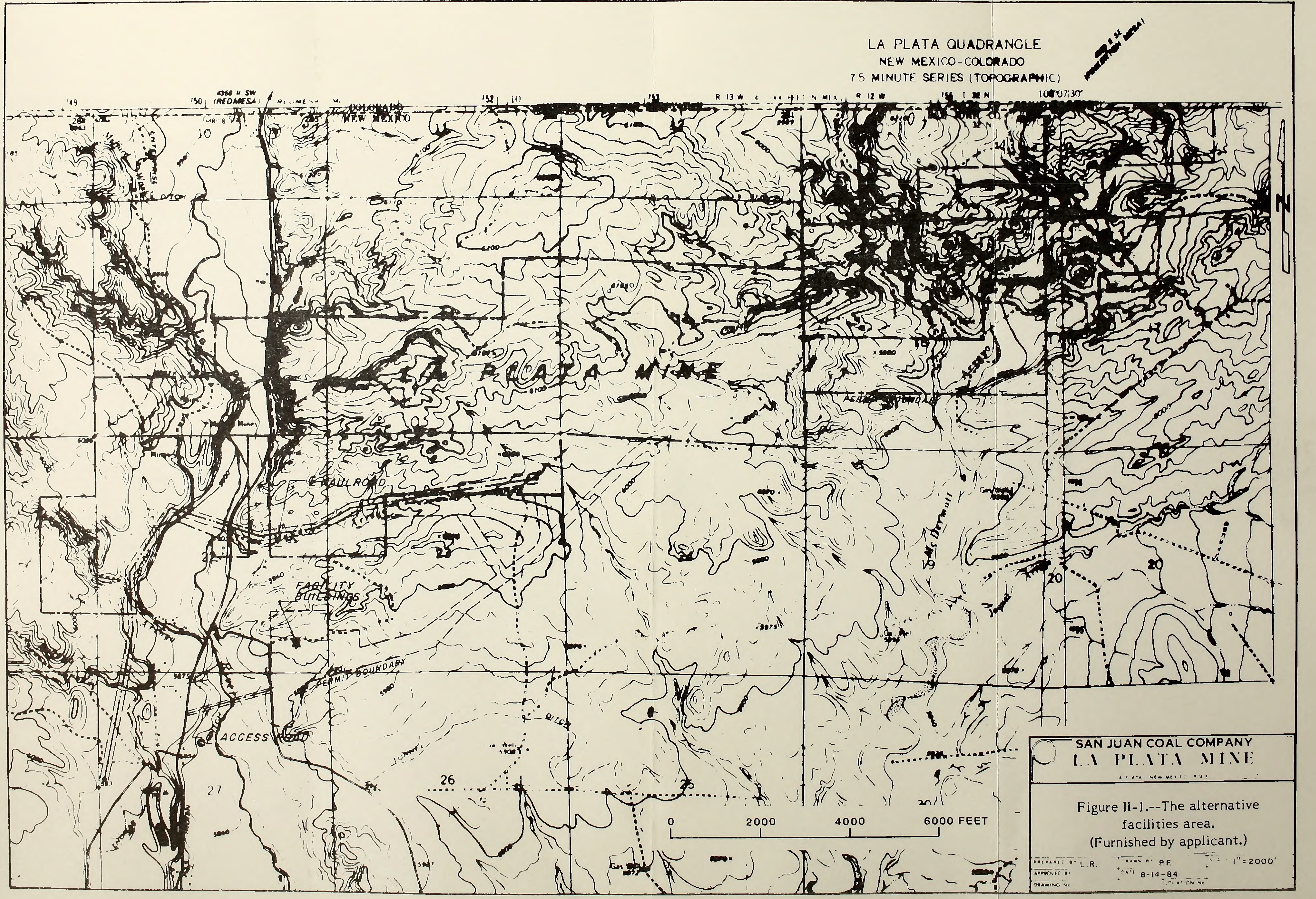

Figure II-1.--The alternative facilities area. (Furnished by applicant.)

CHAPTER III

THE AFFECTED ENVIRONMENT

A. TOPOGRAPHY

The La Plata mine study area is located in the northern part of the San Juan Basin at an elevation of about 6,100 feet. The majority of the area consists of low, rounded, relatively undissected hills, with average slopes of about 12 percent, and of rougher terrain located near the drainage channels, with average slopes up to 25 percent. Steeper slopes of as much as 60 percent occur along the northern and western border of the permit area. Total relief of the permit area is nearly 350 feet; the maximum relief at any spot is about 80 feet. The permit area is drained by McDermott Arroyo and its tributaries, Cinder Gulch, Montoya Arroyo, Manuel Arroyo, and Camp Arroyo. McDermott Arroyo is tributary to the La Plata River.

The proposed transportation corridor would start at an elevation of about 6,000 feet, adjacent to the mine area, and gradually descend to an elevation of about 5,200 feet. The northern one-third of the corridor would cross rougher hills with slopes of up to about 15 percent; the middle one-third would cross several mesas with short, steep slopes of up to 30 percent; the southern one-third would cross terrain that is gently sloping to almost flat. Total relief from the north end of the proposed corridor to the south end is over 700 feet; however, the maximum relief at any one spot is less than 50 feet. The transportation corridor would cross the La Plata River, Murphy Arroyo, Barker Arroyo, Narrows Wash, Hutch Canyon, Shumway Arroyo, and Westwater Arroyo.

B. GEOLOGY

The Fruitland Formation, which underlies the La Plata mine study area, consists of discontinuous, interbedded sandstone, siltstone, shale, carbonaceous shale, and coal. These beds have a northeast-southwest strike and dip to the southeast at approximately 11°. At the base of the Fruitland Formation are the four coal beds of significance to the proposed La Plata mine. These four seams are named, in ascending order, the No. 1, the No. 2, the No. 3b, and the No. 3a. Mineable thickness of coal seam No. 1 ranges from 20 to 37 feet, with an average of 32 feet; of coal seam No. 2, from 7 to 19 feet, with an average of 12.8 feet; of coal seam No. 3b, from 3 to 16 feet, with an average of 6.2 feet; and, of coal seam No. 3a, from 2.8 to 8 feet, with an average of 5.2 feet. All the seams have some splits and partings. The three interburdens, in ascending order, range from 59 to 148 feet, 15 to 92 feet, and 0.4 to 33 feet. The overburden above the top coal seam ranges from 0 to more than 600 feet. There are scattered burn areas along the outcrops of each seam.

The eastern one-third of the permit area has numerous parallel faults trending approximatley N 60° W, with up to 80 feet of vertical displacement. Although minor seismic events have occurred in the area as recently as 1974, none of these faults show any signs of recent movement. The only recognizable fault scraps are in the Pictured Cliffs Sandstone, which erodes very slowly compared to the less resistent rocks of the Fruitland Formation. Some minor block slumping has occurred on the permit area, but seemingly in very ancient times.

The overburden is mostly sandstones, siltstones, and shales. Three test holes were drilled into the overburden and samples of the core were taken every 10 feet for chemical analysis. One drill hole had one interval with a clay content of 48 percent, two had several intervals with a sodium adsorption ratio (SAR) greater than 100, and one had several intervals with an electrical conductivity (EC) greater than 8.0.

Fossil material has been noted in all stratigraphic units in the mine area. Preservation and exposure quality of the specimens is normally poorer in the mine area than for equivalent units elsewhere in the San Juan Basin. Fossil inventories made on exposed strata indicate that no significant variations or new taxa are likely in the mine study area.

C. HYDROLOGY

Surface water.--The La Plata permit area is within the La Plata River basin, which is tributary to the San Juan River. The area is drained by one intermittent stream, McDermott Arroyo, and four ephemeral streams, Cinder Gulch, Manuel Arroyo, Montoya Arroyo, and Camp Arroyo. Montoya, Manuel, and Camp Arroyos originate within the permit area and McDermott Arroyo and Cinder Gulch flow through it. The proposed transportation corridor would cross the La Plata River and six ephemeral streams, Murphy Arroyo, Barker Arroyo, Narrows Wash, Hutch Canyon, Shumway Arroyo, and Westwater Arroyo. Narrows Wash, Hutch Canyon, and Westwater Arroyo are tributary to Shumway Arroyo, which is tributary to the San Juan River. A total of 1.77 square miles (mi^2) within the La Plata River drainage--mostly within McDermott Arroyo--would be disturbed by mining and related activities. An additional 0.6 mi^2, partly within the La Plata River drainage and partly within the Shumway Arroyo drainage, would be disturbed by the transportation corridor. There is one stock pond within the permit area.

The surface-water quality in the area usually varies with discharge: the higher the discharge, the lower the total dissolved solids (TDS) but the higher the suspended solids. The surface water is typically a sodium calcium sulfate water and, during low flows, contains more than 2,000 milligrams per liter (mg/L) of dissolved solids. The few analyses of samples of stream water from McDermott Arroyo and Cinder Gulch show TDS concentrations ranging from 315 mg/L during high flow to 12,700 mg/L during low flow. The water is usually suitable for most uses during high flow, but is unsuitable for domestic or irrigation use and marginally suitable for stock or wildlife during low flow.

According to flood-hazard boundary maps prepared for the U.S. Department of Housing and Urban Development, several flood-hazard areas are located among the lands to be crossed by the proposed transportation corridor. By far the largest to these flood-hazard areas is located in the immediate vicinity of the La Plata River. The locations of these flood-hazard areas are:

- La Plata River (private land): N½ and SW¼ sec. 22 and NW¼NE¼ sec. 27, T. 32 N., R. 13 W.
- Murphy Arroyo (private land): SW¼SW¼ sec. 33, T. 31 N., R. 13 W.
- Narrows Wash (tributary; private land): NW¼NW¼ sec. 5 and SW¼NW¼ sec. 7, T. 30 N., R. 14 W.

- Shumway Arroyo (Federal land): SW¼NW¼ sec. 22, T. 30 N., R. 15 W.
- Westwater Arroyo (private and Federal land): NW¼ sec. 21, T. 30 N., R. 15 W.
- Hutch Canyon (tributary; Federal land): SE¼ sec. 12 and NW¼NW¼ sec. 13, T. 30 N., R. 15 W.

Ground water.--In the area of the proposed La Plata mine, ground water occurs in the alluvium, in sandstone lenses in the Fruitland Formation above the coal, in the coal seams, and in the Picture Cliffs Sandstone. At depth, water occurs in the Point Lookout Sandstone, the Morrison Formation, and other formations.

There are extensive alluvial deposits along the La Plata River just west of the permit area and at the proposed transportation-corridor crossing, and minor deposits along Cinder Gulch and McDermott Arroyo within the permit area. The deposits within the permit area range from 5 to 50 feet wide, and are up to 40 feet thick. The deposits along the La Plata River are 1,200 to 1,400 feet wide and up to 50 feet thick. Because it is recharged by the La Plata River, the La Plata River alluvium contains a substantial amount of water. Because of its limited extent and lack of a perennial recharge source, the alluvium along Cinder Gulch and McDermott Arroyo is not considered an important aquifer.

The Fruitland Formation is composed of discontinuous, interbedded sandstone, siltstone, shale, carbonaceous shale, and coal. Some water occurs in the discontinuous sandstones above the mineable coal beds in the La Plata mine area. However, these sandstones are too discontinuous to be reliable sources of water.

The coal seams total an average of 56 feet thick and form the best shallow aquifers in the permit area. The lower coal seam, No. 1, averages 32 feet thick and is the best of the coal aquifers. The production rate from coal seam No. 1 is as high as 12 gallons per minute (gal/min); production from coal seam No. 2 and coal seam No. 3 is about 2 gal/min.

There are no springs within the permit area. A seep is located in the SE¼ sec. 7 along Halfway Wash, a tributary of McDermott Arroyo. During 1981 and 1982, flow from the seep was less than 1 gal/min.

Most of the shallow ground water (down to and including the coal) in the permit area is of a sodium-bicarbonate type and is suitable only for livestock and wildlife consumption. The constituents most often exceeding New Mexico potable water standards are TDS (855 to 13,300 mg/L, standard = 1,000 mg/L), sulfate (5 to 9,280 mg/L, standard = 600 mg/L), ammonia (0.6 to 12 mg/L, standard = 0.5 mg/L), arsenic (less than 0.01 to 0.194 mg/L, standard = 0.1 mg/L), selenium (less than 0.01 to 0.09 mg/L, standard = 0.05 mg/L), iron (0.02 to 4.8 mg/L, standard = 1.0 mg/L), and manganese (0.001 to 2.5 mg/L, standard = 0.2 mg/L). The coal has the best quality water and the McDermott Arroyo alluvium the worst.

Alluvial valley floors.--Thirteen stream valleys in the area of the proposed mine were examined for alluvial valley floor (AVF) potential. Of these, only the La Plata River, Cinder Gulch, and McDermott Arroyo had sufficient alluvium to warrant further analysis. Because water quality is poor, soils characteristics are not supportive of agriculture, and no irrigation exists along either Cinder Gulch or McDermott Arroyo, these were not considered as AVF's.

The La Plata River valley has unconsolidated streamlaid deposits and sufficient streamflow to support flood irrigation. Flood irrigation has been occurring along the river for many years and the valley floor is interlaced with a network of many irrigation ditches. The La Plata River valley adjacent to the permit area is an AVF.

Water use.--New Mexico water law does not require a permit or ground-water right except in a declared ground-water basin. The State Engineer has not yet declared the La Plata River such a basin, so the records of the number of wells and their use is very sketchy. A field survey by SJCC of the wells within 5 miles of the proposed mine located 85 wells. Of these, 41 are for domestic use, 13 are for stock use, 22 are not currently being used, and the remainder are multiple use. There are no surface-water rights within the permit area or on any of the ephemeral streams draining the area.

D. CLIMATE

The climate in the vicinity of the proposed La Plata mine is semiarid, with low humidity, infrequent precipitation, intense solar radiation, and large annual and diurnal temperature variations typical of the higher-elevation southwest. Average annual precipitation at the site is 11 inches, adjusted for the elevation difference from the nearest stations at Farmington (19 miles south) and Aztec Ruins (13 miles southeast). About 45 percent of the precipitation falls during July through October, occurring mostly as thunderstorms. Snowfall is erratic and usually light, with average snowfall at Aztec Ruins of only 12 inches. Mean annual lake evaporation for northwest New Mexico is 44 inches.

Winds in the area of the proposed mine are generally moderate, with average annual windspeed of about 6 miles per hour. The dominant winds are from the south to southwest in the summer and west to northwest in the winter and spring.

Summer daytime temperatures are usually in the upper 80's to 90's, with occasional low 100's; August's average temperature is 72°F (warmest month). Winter daytime temperatures are usually in the 20's to 30's, with periods below zero; January's average temperature is 28°F (coldest month). The mean annual temperature is 50°F. The growing season averages about 140 days, beginning in mid- to late May and ending in late September to mid-October.

E. AIR QUALITY

General air quality at the proposed minesite and transportation corridor is well within State and Federal standards. The pollutant of concern with respect to the proposed mine is total suspended particulates (TSP), primarily generated as fugitive dust. The pollutants of concern with respect to the proposed corridor are TSP, sulfur dioxide, nitrogen oxides, and carbon monoxide generated by trucks using the corridor.

Data collected at Mesa Verde National Park, about 25 miles northwest of the proposed mine, indicate that TSP concentrations for rural areas are about 15 to 20 micrograms per cubic meter ($\mu g/m^3$). Mesa Verde National Park is a prevention-of-significant-deterioration class I area.

F. SOILS

The soils within the permit area are shown in plate 1 (in pocket). Appendix C gives additional information about the mapping units as well as salvage data. The total area of disturbance would be 1,643 acres, of which 1,011 acres would be from the mine area, 505 acres from the proposed transportation corridor, and 127 acres from support facilities. The surface texture of the area to be disturbed varies from clay to fine sand. Areas of rock outcrop occur as well as soils with gravelly or channery surfaces. The parent materials are sandstone, shale, colluvium, and alluvium.

About 96 percent of the soils that occur in the Younger pit area are shallow or very shallow sandy clay loam or loams with inclusions of some rock outcrop. The remainder are deep fine- and medium-textured soils.

About 72 percent of the soils that occur in the Sundance pit area are shallow or very shallow sandy clay loam with inclusion of rock outcrops. About 26 percent are deep soils that range in texture from clay to sandy loam with clay predominating. Also included are about 2 percent of rock outcrop.

The proposed transportation corridor would cross a variety of soil types over its 20.5-mile extent. The two soil map units most frequently crossed would be the Badland-Monierco-Rock outcrop complex and the Blancot-Notal complex. The Badland-Monierco-Rock outcrop complex contains soils that range in thickness from shallow to nonexistent. These soils occur on hills, ridges, and mesas with slopes varying from 0 to 30 percent. The native vegetative cover of this soil unit is generally used for livestock grazing and wildlife habitat. The Blancot-Notal complex occurs on fans and in valleys. Native vegetation is mainly grass. These soils are deep and well drained. Both soil types occur on very gentle slopes.

About 11 acres of prime-farmland soils occur in the proposed transportation corridor. These soils would be excavated to a depth of 18 inches and stockpiled, leaving the remainder for a road base. The two deep soil mapping units range in surface texture from clay loam to sandy loam.

G. VEGETATION

The seven vegetation types identified in the permit area are mapped on plate 2 (in pocket). Information about each vegetation type is summarized in table III-1. The vegetative cover is typical of the region and is predominantly a pinyon-juniper woodland found on rough terrain where shallow soils (less than 16 inches to bedrock) derived from sandstone predominate. Extensive acreage of the pinyon-juniper woodland on the mine area was chained by the BLM in 1961 to increase forage production. This treated vegetative type is the second most predominant type. Sagebrush-grassland covers a major portion of the remainder of the area that would be disturbed.

The pinyon-juniper woodland is dominated by the tree species--Utah juniper and pinyon pine--and the shrub species--sagebrush, shadscale, rabbitbrush, and

Table III-1.--Vegetation on the La Plata permit area[1]

(Data furnished by applicant)

Vegetation type	Acres to be disturbed	Percent of disturbed area	Percent cover	Shrub density (individuals/ acre)
Pinyon-juniper[2]	341	30	16.5	660
Pinyon-juniper chained	508	45	9.8	2,149
Greasewood-sagebrush	50	4	15.7	5,944
Sagebrush-grassland	194	17	13.3	4,128
Grassland	11	less than 1	11.0	NA[3]
Previously disturbed	25	2	0	NA
Agricultural	7	1	ND[4]	NA
Riparian	2	less than 1	ND	ND
Total	1,138	100		

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[1] Includes the 2.05 miles of transportation corridor that would cross the La Plata River area, haul roads, overburden dumps, topsoil stockpiles, and sediment ponds.

[2] Includes pinyon-juniper grassland (16 acres).

[3] NA = not applicable.

[4] ND = no data.

mountain mahogany. Galleta is the major grass species. On the chained parts of the pinyon-juniper woodland, pinyon and juniper species have reestablished and an increased cover of antelope bitterbrush, galleta grass, and Indian ricegrass has developed. The sagebrush-grassland is dominated by the shrubs--big sagebrush and greasewood--and the grasses--galleta and alkali sacaton.

Nine vegetation types would be disturbed by the transportation corridor. Information about each type is summarized in table III-2. The southern portion of the proposed corridor is characterized by scattered stands of greasewood along drainages and by grasslands on the flats. The northern section has scattered stands of pinyon-juniper on broken ridges and sagebrush intermixed with grassland openings on the flats.

H. WILDLIFE

The La Plata mine study area is composed of a mixture of habitat types supporting a diverse community of wildlife species. Although dominated by pinyon-juniper, this area is interspersed with sagebrush-grassland, greasewood-sagebrush, grassland, and riparian habitats. Other habitat features include a small agricultural area, rock outcrops, seeps, and impoundments. Within the pinyon-juniper type, there are areas that were chained to reduce the density of pinyon and juniper and open the area to increased shrub, forb, and grass production.

Surveys of wildlife in the area reflect this mixture of habitats, edge, and interspersion. Fifty mammal species, 101 species of birds, and 25 species of herptiles occupy or are likely to utilize the proposed minesite. The only fish populations found in the vicinity were minnows and suckers collected from the La Plata River. A brief description of the documented use of the La Plata habitats by some species follows.

Mammals.--Large mammals noted in the La Plata area were elk, mule deer, antelope, and mountain lion. Elk, antelope, and mountain lion use of the site is not significant but the area is part of an important winter range for approximately 500 mule deer. Owing to this mule deer use, SJCC conducted a trapping, radio collaring, and monitoring study to document deer movements and habitats on the proposed La Plata site. Results of this study indicated that mule deer winter in the area from October until May, when they leave for summer range in southern Colorado. While mule deer utilized several habitats, most of their time was spent in the pinyon-juniper and sagebrush-grassland habitats. Mule deer fed almost exclusively on browse species during the winter, with 72 percent of their diet consisting of big sagebrush and juniper.

Other mammals observed in the area were coyote, bobcat, gray fox, raccoon, porcupine, striped skunk, desert cottontail, black-tailed hare, and prairie dog. Various species of rodents were captured or observed on the site, including the deer mouse, antelope squirrel, chipmunk, and rock squirrel. Several species of bats are also potential residents of the La Plata habitats. While the chained pinyon-juniper supported the most small mammal species, more small mammals were captured per 100 trap-nights in the sagebrush-grassland habitat.

Birds.--Several raptors utilize the La Plata area. Confirmed nesters include a ferruginous hawk, kestrels, red-tailed hawks, and great horned owls; probable nesters include golden eagles, marsh hawks, and turkey vultures. The red-tailed

Table III-2.--Vegetation on the proposed La Plata mine transportation corridor[1]

(Data furnished by applicant)

Vegetation type	Acres to be disturbed	Percent of disturbed area	Percent cover	Shrub density (individuals/ acre)
Pinyon-juniper	26	6	11.2	225
Annual grassland	175	42	19.3	NA[2]
Galleta grassland	6	1	13.6	NA
Sagebrush grassland	112	27	13.8	2,435
Sagebrush grassland (treated)	1	1	9.8	4,663
Winterfat-grassland	6	1	19.2	2,118
Greasewood bottomland	62	15	14.4	823
Shadscale-sagebrush	14	4	9.2	2,127
Greasewood-fourwing grassland	11	3	19.8	782
Total	[3]413	100		

[1] Corridor acreages start west of the La Plata River.

[2] NA = not applicable.

[3] Does not include 92 acres within the San Juan mine permit area.

hawk and owl nests are along McDermott Arroyo, less than 1,000 feet east of the proposed mine watering pond. The U.S. Fish and Wildlife Service (USFWS) has identified three ferruginous hawk nests near the proposed transportation corridor.

Bald eagles roost along a portion of the La Plata River less than 1,000 feet west of the permit boundary.

Upland game birds include Gambel's quail, scaled quail, and possibly chukar partridge. Several waterfowl species are associated with the La Plata River. A diverse community of passerines is associated with all the habitats but the pinyon-juniper habitat supports a greater abundance and diversity than the others.

Reptiles and amphibians.--While not always recognized, herptiles are an important part of the ecosystem, serving as prey for and sometimes preying on birds and mammals in the area. Although only a few species were observed during opportunistic surveys, a number of herptiles are expected to occupy the proposed minesite. Although some species are suited to certain soil types, woody debris and rocky areas are particularly valuable shelter for most herptiles.

Fish.--Owing to the intermittent nature of its flow, the La Plata River in the vicinity of the proposed mine is poor fish habitat. During field surveys, only two minnow species and two sucker species were collected, all from areas characterized by disconnected pools of water.

Threatened and endangered species.--Based on discussions between SJCC and USFWS, there are three endangered but no threatened animal species which could utilize the La Plata area. These species are the bald eagle, peregrine falcon, and black-footed ferret. Surveys by SJCC found no evidence of the peregrine falcon or black-footed ferret in the area but did document a bald eagle roost along the La Plata River just west of the permit boundary.

I. LAND USE

The La Plata mine study area is currently used for cattle and sheep grazing, wildlife habitat, gas production, hunting, wood cutting, and, along the La Plata River, irrigated farming. The proposed mine and facilities areas would be constructed on parts of four BLM grazing allotments. The proposed transportation corridor would cross another four allotments. Drilling for gas has occurred around the mine area; several gas wells are in production adjacent to the mine area and their gathering lines cross the permit area. The irrigated farmlands along the La Plata River are considered prime farmland. (See appendix D.)

Several rights-of-way have been issued by BLM on lands within the mine study area. These include:

- NM-29081 (Shell Oil Company), for a buried carbon dioxide gas pipeline through secs. 19, 17, and 20, T. 32 N., R. 12 W. and secs. 22, 23, and 24, T. 32 N., R. 13 W.;
- NM-36909 (Western Coal Company, transferred to Sunbelt Coal Company), for a coal haul road through secs. 18 and 19, T. 32 N., R. 12 W. and secs. 13, 22, 23, and 24, T. 32 N., R. 13 W.;

- NM-41911 (El Paso Natural Gas Company), for a buried natural gas gathering pipeline in sec. 11, T. 32 N., R. 13 W.;
- NM-41917 (El Paso Natural Gas Company), for a buried natural gas pipeline through secs. 18 and 19, T. 32 N., R. 12 W. and secs. 13 and 14, T. 32 N., R. 13 W.;
- NM-42235 (El Paso Natural Gas Company), for a buried natural gas gathering pipeline in sec. 14, T. 32 N., R. 13 W.;
- NM-43084 (Southern Union Gas Company), for a buried natural gas gathering pipeline in secs. 23 and 24, T. 32 N., R. 13 W.;
- NM-43085 (Southern Union Gas Company), for a buried natural gas gathering pipeline in sec. 23, T. 32 N., R. 13 W.;
- NM-44440 (Southern Union Gas Company), for a buried natural gas gathering pipeline in secs. 23 and 24, T. 32 N., R. 13 W.;
- NM-44441 (Southern Union Gas Company), for a buried natural gas gathering pipeline in sec. 24, T. 32 N., R. 13 W.; and
- NM-20432 (Public Service Company of New Mexico), for a 345-kV electrical transmission line.

Nine Federal oil and natural gas leases would be affected by the proposed transportation corridor. Some of the leases are located entirely on Federal lands, whereas others encompass private lands where the Federal government has retained the oil-and-gas mineral rights. These leases are: SF-080508 (private surface); NM-12661 (Federal surface); NM-18468 (Federal surface); NM-10875 (Federal surface); NM-21464 (private surface); NM-10172 (Federal surface); NM-0271A (private surface): SF-079007 (Federal surface); and SF-078818A (Federal surface). Portions of three Federal coal leases also would be affected by the proposal. Two of these leases (NM-045197 and NM-045196) are held by SJCC. Paragon Resources and Valencia Coal Company hold the third lease (NM-28093), which is for a proposed underground mine.

The Bureau of Reclamation plans, as part of the Animas-La Plata Project, to build several facilities near the proposed mine and transportation corridor. These include the Southern Ute Dam and Reservoir, located on Cinder Gulch in sec. 7, T. 32 N., R. 12 W. and secs. 12 and 13, T. 32 N., R. 13 W.; the New Mexico Irrigation Canal, extending 3.1 miles south and west from the dam; the Third Terrace Pumping Project, located at the end of the canal in sec. 22, T. 32 N., R. 13 W.; and the La Plata irrigation laterals, located at various places in the La Plata valley. (See appendix E.)

J. SOCIOECONOMICS

OSM obtained socioeconomic information regarding the vicinity of the proposed La Plata mine from various sources, including reports prepared for OSM by Fred C. Hart Associates, Inc. (1983a, 1983b).

Given the location of the proposed La Plata mine, 18 miles north of Farmington, New Mexico, OSM defined the primary area of socioeconomic impact as San Juan County, the La Plata valley, and the Farmington Municipal School District, and the secondary areas of impact as the Navajo, Ute Mountain, and Southern Ute Indian Reservations, southern La Plata County, and the city of Durango, Colorado. Because of the greater distance of these secondary areas of impact from the proposed mine, OSM's analysis focused on the primary impact area.

OSM developed a baseline scenario that projects future economic activity and resulting socioeconomic impacts within the New Mexico part of the San Juan Basin without the proposed La Plata mine. This scenario assumes that employment levels at several existing projects would change and that a number of proposed new projects would be constructed and would begin operations between 1984 and 2000 (Fred C. Hart Associates, Inc., 1983b, table A-1, pages 82-83). Essential assumptions of this baseline projection are:

- Total annual coal production would increase almost threefold, from five mines and 12.4 million tons in 1982 to eleven mines and 31.2 million tons in 2006.
- Two coal-fired generating stations (San Juan and Four Corners) would continue operations and one additional station (New Mexico Generating Station) would be built.
- Two railroad spurs (Star Lake Railroad and ConPaso Railroad) would be constructed into southern San Juan County.
- Declining oil and gas employment would stabilize after 1984.
- Construction of the Animas-La Plata Project would begin in 1984 (now projected to start in 1986).
- Employment at the Navajo Agricultural Products Industry would expand through 1990, then stabilize.

Population.--During the decade of the 1970's, the population of San Juan County increased 55 percent, from 52,517 to 81,433. Approximately 33 percent of the county's population is Native American Indian, 49 percent is Anglo, 12 percent Hispanic, and 6 percent other. Population projections under the baseline scenario indicate an initial period of decline, then continual moderate growth through 1995, followed by a slight decrease. During 1983-84, a decline was expected owing to completion of construction at the San Juan and Four Corners Generating Stations and a continuing decrease in regional oil and gas employment. Overall, however, between 1980 and 2006, the population of San Juan County is expected to increase by 11,100 persons, from 81,433 to 92,568, or by about 14 percent (Fred C. Hart Associates, Inc., 1983b, table 2, page 18). This 14-percent increase projected for the 26 years between 1980-2006 represents a considerable slowing of growth compared to the growth between 1970 and 1980.

Farmington's population is expected to increase by 5,939 persons, from 31,222 in 1980 to 37,161 in 2006, or by about 19 percent. The La Plata valley is projected to experience the highest rate of growth in the study area (39 percent), from 800 persons in 1980 to 1,109 in 2006. The La Plata valley is rural and predominately agricultural in nature. In recent years, the valley has experienced substantial growth as some lands have been subdivided and residents of Farmington have relocated to the more rural areas. The growth initially occurred in the lower valley near Farmington; however, it is now progressing northward up the valley.

Employment.--Unemployment in San Juan County was 4,167 persons or about 11 percent of the labor force in 1982. Local unemployment continued to rise to 5,434 persons, or about 14 percent, in September 1983, owing to declining oil/gas activity, reduction of construction work at the powerplants, and the general economic slowdown (Fred C. Hart Associates, Inc., 1983b, table 3, page 21).

The labor force data illustrate the dual strengths in the county's economy: energy activity and trade/services. In 1982, over 13,000 persons, or 41.5 percent of the workforce, were employed in mining, contract construction, and the transportation and utilities sectors. The trades and services sector employed nearly 11,000 persons, or another 35 percent. Government employment at all levels is an important component of the local economy, with over 5,000 employees in 1982.

San Juan County employment will continue increasing through the year 2006, but at a much reduced rate. From the 1980 level of 31,603 jobs, employment is projected to increase to 38,599 jobs by 2006, a 6,966-job or 22-percent increase over a span of 26 years compared to the 130-percent increase during the decade of the 1970's. Total employment is expected to peak at 39,304 jobs in 1985 before declining through 2006. About 2,100, or 27 percent, of the new jobs would be in energy, mining, and coal transportation.

Personal income.--In 1980, personal income of San Juan County residents totalled $672.5 million, with $74.8 million reflecting residency adjustments and $67.7 resulting from government employment. Of the remaining $530 million generated in the private sector, $332 million, or about 63 percent, was attributable to mining, construction, and the transportation/public utilities sectors, even though these activities accounted for only 49 percent of non-government employment.

Housing.--According to the 1980 census, housing totalled 29,730 dwelling units, more than double the 1970 total. The housing supply has increased more rapidly than population, resulting in a decrease in average occupancy per unit from 3.51 in 1970 to 2.74 in 1980. The major trend over the 10-year period was a doubling of the number of mobile homes in San Juan County to approximately one-quarter of the total housing supply. The San Juan County Planning Office estimated that 1983 vacancy rates were approximately 6 to 8 percent.

Land constraints, financial considerations, and population mobility caused the trend toward mobile homes. Sufficient land generally exists for additional housing development, but, in the La Plata valley, agricultural land is decreasing as small farms are sold and converted to residential development.

Projected housing demand under the baseline scenario parallels population growth. The average annual new housing demand between 1985-89 for 514 units would be less than the 726-unit average annual addition to the housing stock in Farmington, Aztec, and Bloomfield between 1970-80. The construction industry should be able to keep up with demand, although approximately 1,700 new housing units will be needed during 1986-87. If current trends continue, fewer conventional family homes will be built, but there will be greater increases in multi-family and mobile home units. Owing to the relatively high demands, sporadic temporary shortages in these two types of housing could develop.

Education.--Of the four school districts in San Juan County, all except the Aztec District are at or near capacity. The Farmington Municipal School District, the largest and most directly impacted by energy development, is currently facing an acute shortage of facilities. After repeatedly rejecting past school bond proposals, the district recently approved an $11.6-million issue for construction of new schools. However, most of the issue will be expended for replacement of approximately 50 portable classrooms now in use. Consequently, since the district has reached its bonding capacity with this new issue, problems with inadequate facilities will continue unless additional capital funds are secured from other sources. Enrollment is expected to reach 9,500 pupils by 1990, an increase of 19 percent over the current enrollment of 8,000 students.

Public financal resources.--Briefly, the public financial resources available for the four primary jurisdictions in the impact area are:

San Juan County.--A major portion of the county's revenue (from property taxes, oil and gas production, and Federal grants) is linked to the energy industry, independent of local population levels. However, these revenues have not been constant because of recent declines in oil and gas activity. San Juan County had an overall budget deficit of approximately $400,000 in fiscal year 1981. This deficit resulted primarily from major capital outlays for public services and debt-service obligations on outstanding general-obligation and revenue bonds. A general fund surplus of $2.6 million in 1981 was allocated to cover future budget deficits. Throughout the period of 1980 to 2000, the county has derived and should continue to derive substantial increases in revenues from energy projects, particularly from the New Mexico Generating Station, anticipated in the baseline scenario. This should produce a positive fiscal condition for the county.

Farmington.--Total revenues for the city of Farmington were $74.2 million in fiscal year 1981. Expenditures for the same year were only $51.4 million. However, most of the surplus was in capital funds (from bond sales) earmarked for expenditure over the next 5 years to complete ongoing improvement projects.

Projections of future financial conditions under the baseline scenario vary considerably, with operating fund surpluses anticipated through 1993, followed by deficits in 6 of the 7 years through the year 2000. Farmington operates extensive enterprise activities (electric, gas, water, and sewer utilities), and expenditures from the combined enterprise fund are almost double the city's general fund budget. Its debt service on borrowed funds for constructing or expanding these facilities was $4 million in 1981.

Aztec.--Revenues and expenditures of enterprise activities were the largest components of Aztec's 1981 fiscal year budget, amounting to $1.58 million of the $3.45 million total. Capital funds amounted to $0.62 million and operating fund revenues were $1.24 million. Expenditures in 1981 totalled $3.2 million, resulting in a net surplus of $200,000. A cumulative total net surplus is anticipated in Aztec under the baseline scenario for all years except 1997, when a negligible deficit is expected.

Farmington Municipal School District.--The Farmington Municipal School District has the largest enrollment of the four districts in San Juan County. Total district revenues were $17.9 million in 1981, $14.1 million for operational purposes (with $12 million coming from State equalization funds).

Proceeds of a recently approved bond issue will be used for additional classrooms and administrative facilities, thereby allowing 50 portable classrooms to be mothballed and held in reserve for the future. District operating funds are expected to have consistent surpluses through the year 2000. Financing of future capital improvements, however, are uncertain under the baseline scenario because the recent bond issue consumed virtually all the district's bonding capacity.

Community services.--The services described below have too little capacity to serve population levels projected under the baseline scenario. The capacity of services not mentioned is adequate.

San Juan County.--In 1981, San Juan County had the highest vehicle accident rate in the State, approximately 580 accidents per 100 million vehicle miles driven. New Mexico State Highway 170, north of Farmington to the Colorado border, is narrow, winding, and was rated deficient in safety by the New Mexico State Highway Department. It needs to be widened and resurfaced. Five bridges were recently replaced, but actual road improvements are not planned until 1990. Without the improvements, existing conflicts between commercial and commuter traffic and local agricultural and school-bus traffic will be aggravated. Similar improvements should be made on State Highway 173 between La Plata and Aztec; traffic is low at present but will intensify by the mid-1980's.

The San Juan County Growth Management and Housing Plan found the rural areas "underserved" in health care, particularly in ambulance service and emergency treatment. Most La Plata valley residents choose to seek medical treatment in Farmington or Durango, but they appear to feel health care is adequate. The regional medical center provides extensive medical care opportunities and has excess capacity.

While outdoor recreational opportunities abound in the area, and other recreation is available in Farmington, rural sections of the county lack developed recreation facilities. Many of the existing facilities are provided by the local schools, none of which is located in the valley. Human-service agencies in the county are operating at full capacity, partially owing to additional stress from the depressed economy on individuals and families.

Farmington.--With no railroad traversing the area, roads are the major means of transportation. Because the county road systems are deficient, and extensive improvements are being made to the urban road system, both the city of Farmington and San Juan County spend a sizable proportion of their tax revenues and grants on road maintenance and improvement. More road improvement is still needed, however, and awaits a substantial infusion of funding.

Aztec.--The water-supply system is adequate for another 5,500 persons or almost double the current population. Additional sewer facilities for 4,500 persons were completed in 1984.

Social environment.--San Juan County's social environment is characterized chiefly by ethnic and lifestyle differences, based on perspectives regarding land use, economic pursuits, or geographic location. Other characteristics of the social environment, however, are a shared love of the outdoor recreation opportunities that the area offers, a general fondness for life in northern New Mexico, and a common belief that the county's energy-related resources should be developed to some degree.

The county's three major ethnic groups are Native American Indian, Anglo-American, and Mexican-American. The Indian groups live primarily on reservations that are either in the county or are adjacent to it; however, Native Americans also live in Farmington and other communities in the county. The largest single Native American group in San Juan County is the Navajo. More than half the county's population lives in and around Farmington.

Some lifestyle differences often relate directly to different perspectives regarding land use: agriculture, energy, and recreation. The county was originally an agricultural area. While only a small proportion of the county's residents still rely solely on farming and ranching, numbers of families continue to raise some crops or livestock because of their affinity for a more rural lifestyle. This is particularly true in the upper La Plata valley, which is one of the few concentrations of privately owned land in San Juan County. The valley residents are predominately Anglo, and many are direct descendants of the area's original Anglo settlers. The valley has recently experienced growth owing to its proximity to Farmington. The transition in the valley from rural to more urbanized land uses will continue to affect a way of life that many residents have known for several generations. Although a characteristic of Farmington's population might be transiency, this is not true of the majority of residents in the valley. The more recent residents of the valley have chosen to locate there because of the rural environment and lifestyle.

K. TRANSPORTATION

Access to the proposed La Plata mine would be by New Mexico State Highways 170 from Farmington or 173 from Aztec, or by Colorado State Highway 140 from Hesperus. Traffic on State Highways 170 and 140 is moderate to heavy; traffic on State Highway 173 is light. The 1982 average daily traffic (ADT) volume on State Highway 170 varies between 3,750 vehicles per day near the junction of State Highway 170 and U.S. Highway 550 just west of Farmington and 840 vehicles per day in the northern part of the valley near the minesite. ADT volume on State

Highway 173 ranges from 714 vehicles per day north of Aztec to 314 vehicles per day at the intersection with State Highway 170 (J. Wood, Planning Division, New Mexico State Highway Department, oral communication, 1983). State Highway 170 is narrow throughout the entire La Plata valley and is winding in many sections. It has been rated as "deficient in safety" by the New Mexico State Highway Department and ranks high on the priority list for improvement. The condition of State Highway 173 is also poor, with broken surfacing and no shoulders.

Considerable changes in ADT and highway conditions are expected without the La Plata mine. ADT volumes would decline as operations at the Black Diamond humate mine cease. On the other hand, ADT increases are anticipated as a result of the 30-percent increase in population residing in the valley, commuting of construction workers to the Animas-La Plata Project, and potential commuting by Colorado residents working in San Juan County. Although the absolute ADT for State Highways 170 and 173 has not been projected, the combined effect of these changes is likely to double current ADT.

The New Mexico State Highway Department has begun improvements of State Highway 170. The first stage of the project involves grade work, widening, alignment changes, and resurfacing approximately 5 miles, beginning at the junction with U.S. Highway 550. Other improvements will be made on the mid- to upper portions of State Highway 170, although they are not scheduled to occur before 1990. As residential and energy development occurs in the La Plata valley, the need for improvements will increase, and the remaining improvements will be scheduled. The highway department has no definite plans for improving or repairing State Highway 173.

Commercial and private air service is available at the Farmington Municipal Airport. No changes are expected in air transportation.

No rail service currently exists in San Juan County. Two coal-haul rail spurs may be developed in the future. The Star Lake Railroad is discussed in the Star Lake-Bisti regional coal EIS (Bureau of Land Management, 1979) and the ConPaso Railroad is discussed in the Navajo-El Paso/Consolidation Coal EIS (Bureau of Indian Affairs, 1977). These projects will not affect the La Plata valley or the proposed La Plata mine.

The coal haul road for the proposed mine would follow a 20.5-mile corridor from the mine pits to the crushing facilities at the San Juan mine near Waterflow, New Mexico. Much of this route would be over fairly flat terrain, permitting the construction of road grades of less than 1 percent. The steeper portions of the route would be constructed with maximum grades of 7 percent. The road would have a 44-foot roadway width. To allow for adequate settlement of the road grade, the chip-seal surface would not be applied until the second year. However, the part of the road crossing the La Plata valley would be chip-sealed before being used by any coal-haul traffic. During the first 2 years of road use, water would be applied to control fugitive dust and to aid in compaction.

An employee and mine-supply access road would be parallel to the main coal haul road from New Mexico State Highway 170 to the mine. This access road would be constructed at the same time as the main coal haul road. An upgraded intersection with acceleration and deceleration lanes would be constructed at State Highway 170. Because of the 140-ton coal truck traffic on the transportation corridor, the corridor would not be a public road.

L. RECREATION

The primary recreational use of the La Plata mine study area is hunting. Data on the number of hunters are not available, but a number of hunters use the area because of its proximity to Colorado and the migration of deer across the State line. The only other recreational uses of the area are dispersed activities, such as offroad vehicles, rock hunting, wood cutting, and sightseeing.

Navajo Lake and Navajo Lake State Park, 40 miles east-southeast of the proposed mine, provide fishing, camping, and water sports. San Juan National Forest, 50 miles north of the proposed mine in Colorado, provides the same activities plus skiing, snowmobiling, and similar activities.

The only public park and recreational facilities available near the mine area are at the local public schools in Farmington.

There are no wilderness areas or areas under review for possible wilderness designation in or near the proposed mine area or transportation corridor.

M. CULTURAL RESOURCES

Several archeological surveys of varying degrees of intensity have been made in the mine study area.

John Beal, of the School of American Research, has been primarily responsible for the archeological survey of the proposed La Plata minesite; Jill Seyfarth, associated with the Division of Conservation Archeology, San Juan County Museum Association, surveyed the proposed transportation corridor (Beal, 1978a, 1978b, 1979, 1982; Seyfarth, 1981, 1983a, 1983b, 1983c).

Archeological surveys have located 134 sites--70 in the proposed transportation corridor and 64 in the mine area. Of the 64 sites in the mine area, most are considered prehistoric. Both prehistoric and historic components are found in several sites. Of the 134 sites, 28 are National Register significant and would be affected by the building of haul roads, the excavation of pits, and the development of the facilities area. These sites would be subject to mitigative treatment.

Prehistoric and historic remains dating from before the beginning of the Christian Era down to the present can be found throughout the La Plata region. Prehistoric settlement seems to have been most dense between A.D. 900 and 1300. Sites vary greatly in size, with the largest--villages of more than 100 rooms--situated on the first gravel terraces of river systems. Mounds of masonry rubble mark these sites today. Vandalism and illicit digging by treasure hunters have compromised the integrity of many of the prehistoric sites and have contributed to their deterioration through erosion. Because little scientific work has been undertaken in the La Plata area, the archeology of the region remains poorly known.

Most historic structures and values of the area are substantial residences and associated buildings and features identified with agriculture and livestock raising. Many continue in use but have not been documented. Some evidence of small-scale coal mining can still be seen.

Investigations in the valley by Earl Morris during the 1930's established a chronological and cultural infrastructure for all subsequent archeological work in the region. Morris's work strongly influences current archeological thinking throughout the Four Corners area.

Clearly the most important site in the La Plata lease is Morris 41, a major Anasazi village and one of 88 recorded Chacoan outliers or sites related to the prehistoric developments in Chaco Canyon, approximately 65 miles to the south-southeast. In 1980, Congress passed Title V of P.L. 96-550; its primary purpose is to protect and preserve the prehistoric Chacoan megalopolis. Morris 41, one of the prehistoric villages within the megalopolis and listed in the National Register, will not be directly impacted by the proposed La Plata mine project.

Several important questions relating to puebloan occupation of the La Plata River valley have yet to be addressed. These questions (relating, for example, to interaction among subdivisions of the prehistoric Anasazi, including the transmission and adoption of cultural traits, population dynamics, land-use practices, and regional depopulation) may be resolved through use of state-of-the-art archeological methods or by data yet to be recovered. Application of modern archeological methods and techniques can be expected to add much to our understanding of the Chacoan outliers and their relationship to the major Anasazi settlements of Mesa Verde and Chaco Canyon. Similarly, research into the development of modern agriculture, cattle and sheep raising, territorial architecture, and peopling of the La Plata valley must be completed before large-scale coal extraction and associated activities disturb or destroy these fragile historic values.

N. ESTHETICS

Noise.--From April 25 through 29, 1983, SJCC conducted a baseline noise investigation on the mine area and along the transportation corridor. Representative sound level measurements were made at five sample points in remote areas with little or no vehicular traffic and little or no human activities, where sound levels were not expected to fluctuate greatly over a 24-hour period. Noise level also was sampled over 24 hours along New Mexico State Highway 170 near the proposed transportation corridor crossing.

The results from the five remote areas indicated sound levels ranging from 15 to 52 decibels (dB) for the evening sampling and from 13 to 56 dB for the morning sampling, with a day/night sound level (Ldn) ranging from 33 to 43 dB measured on the A scale (dBA). The sound levels were caused by jet airplanes overhead, offroad vehicles, birds, barking dogs, and wind. The results from the 24-hour sample site indicated equivalent sound levels (Leq) peaking at 83.3 dBA between 6 and 7 a.m., dropping to 69.3 dBA between 10 and 11 a.m., peaking again at 75.8 dBA between 5 and 6 p.m., and dropping again to 45.0 dBA between midnight and 5 a.m. The Ldn for this site was 74.5 dBA. (For comparison, note that light automobile traffic at 100 feet is rated at 50 dBA, an air conditioner at 20 feet is rated at 60 dBA, and freeway traffic at 50 feet is rated at 70 dBA.)

Visual resources.--The landscape within the area of the La Plata mine and transportation corridor is rolling sagebrush and short-grass prairie land with some pinyon-juniper brush land. The La Plata valley has trees along the river with scattered houses and irrigated farmland. BLM has classified the La Plata valley as visual resource management class III and the remainder of the area as visual resource management class IV (Bureau of Land Management, 1979). The BLM manual describes these classes as follows:

> "Class III. Contrasts to the basic elements caused by a management activity may be evident and begin to attract attention in the characteristic landscape. However, the changes should remain subordinate to the existing characteristic landscape.
>
> "Class IV. Contrasts may attract attention and be a dominant feature of the landscape in terms of scale; however, the change should repeat the basic elements inherent in the characteristic landscape."

CHAPTER IV

ENVIRONMENTAL CONSEQUENCES

This chapter analyzes the environmental consequences to all resources of implementing alternative A (approval of the mining plan and the transportation corridor plan, with conditions, and issuance of a Federal permit to mine coal, the preferred alternative), which consists of mining, construction of a transportation corridor, and reclamation as proposed by SJCC in its PAP. Impacts from alternative B (disapproval of the plans) and alternative C (no action) are briefly discussed in chapter II. Each section of this chapter begins with a summary of the anticipated environmental consequences printed in **boldface** type. The conclusions in the summary are documented in the discussion of site-specific impacts in the text that follows it. Table IV-1 summarizes the unavoidable adverse effects of the proposed La Plata mine.

The interdisciplinary team has not analyzed the environmental consequences of the proposed mine in isolation: effects are considered as the difference between the total expected changes in each affected resource with the mine and other existing and proposed development, and the total expected changes in that resource during the same period without the mine. Thus, for example, the effect of the proposed mine on the population of Farmington is measured by the difference between the anticipated population with the mine and the anticipated population without it.

Moreover, the team has discussed environmental consequences in terms of their **significance**, using criteria set forth by the Council on Environmental Quality (40 CFR 1508.27), the total impact to the resource in the context of the resource within the region, the mitigation provided by the PAP, and the professional judgment of resource specialists on the team.

As the following analysis indicates, mining and construction of a transportation corridor would not severely interfere with the future use of the region's or the Nation's renewable resources. The use of some resources--soils and vegetation, for example--would be decreased on the minesite during the life of the mine and into the reclamation period. However, the minesite would support the primary land uses of the region (livestock grazing and/or wildlife habitat) after reclamation is completed.

Because of the amount of, and impacts associated with, development already occurring in the San Juan Basin, the general acceptance of energy growth by the communities in the area, and the fact that about 42,400 tons of coal would be mined for each acre disturbed, the environmental consequences of mining the 66 million tons of coal at the La Plata site could not be appreciably lessened by using a different method of mining or by mining elsewhere.

A. TOPOGRAPHY

Areas disturbed by mining and construction of the proposed transportation corridor would be returned to approximately their original contours, but overall postmining slopes would be less steep than premining slopes. The restored land

Table IV-1.--Summary of impacts

Resource	Environmental consequences	Intensity[1] and context	Duration
Climate	Localized modification of the microclimate, including higher soil temperatures and reduced soil moisture on areas of bare ground.	Minor on minesite.	Life of mine.
Air quality	Increased TSP levels, but would be within Federal and State limits.	Moderate on minesite; negligible on a regional basis.	Life of mine.
Topography	Land surface would be restored to approximate orginal contours. Reclaimed surface would blend with adjacent lands.	Minor on minesite; negligible on a regional basis.	Permanent.
Geology	The natural geologic sequence would be disrupted on 984 acres. The physical properties of the overburden would be altered. Coal would be removed.	Major on minesite; minor on a regional basis.	Permanent.
Soils	Soils would be disturbed on 1,643 acres. Chemical and physical properties of soil would be altered. Productivity would be similar to premining conditions.	Major on minesite; minor on a regional basis.	Life of mine.
Hydrology	Destruction of existing aquifers and replacement with unconsolidated overburden.	Moderate on minesite.	Permanent.
	Decrease in quality of ground water in the replaced overburden.	Minor on minesite.	Permanent.
	Lowering of potentiometric surfaces by pumping and drainage into active pits.	Major to moderate on adjacent areas.	Life of mine.

Table IV-1.--Summary of impacts--Continued

Resource	Environmental consequences	Intensity[1] and context	Duration
Vegetation	Progressive loss of vegetation on 1,643 acres, replaced by vegetation of the same seasonal variety appropriate to postmining land use.	Major on minesite; minor on a regional basis.	Life of mine.
	Reduction in livestock-carrying capacity during mining.	Moderate on minesite; minor on a regional basis.	Life of mine.
Wildlife	About 600 acres of habitat unavailable in any given year.	Moderate on minesite; minor on a regional basis.	Life of mine.
	Increased road kills and general harassment.	Minor on a regional basis.	Life of mine.
Land use	About 600 acres will be unavailable for other uses in any given year.	Moderate on minesite; negligible on a regional basis.	Life of mine.
Transportation	Public roads subject to increased local traffic, resulting in increased noise, dust, and accidents.	Moderate on a regional basis.	Life of mine.
	Visual and noise impacts would occur on and adjacent to transportation corridor.	Major on adjacent areas; minor on a regional basis.	Life of mine.
Recreation	Hunting and woodcutting would not be permitted on part of the mine area. Dispersed recreation would increase.	Moderate on minesite; minor on a regional basis.	Life of mine.
Cultural resources	Known and unknown historic and prehistoric sites would be destroyed.	Minor on minesite owing to mitigation; currently minor on a regional basis.	Permanent.
Visual resources	Surface facilities located in remote area.	Minor on adjacent areas.	Life of mine.

Table IV-1.--Summary of impacts--Continued

Resource	Environmental consequences	Intensity[1] and context	Duration
Seismic activity	Frequency and intensity of ground vibration from blasting would increase.	Minor on adjacent areas.	Life of mine.
Socio-economics	The project-related population increase of about 760 people would increase the demand for public services, especially health care and wastewater treatment.	Moderate on a regional basis.	Life of mine.
Safety	Worker injuries would occur.	Minor on minesite and on a regional basis.	Life of mine.

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[1] Intensity: negligible = at lower levels of detection; minor = detectable but slight; moderate = readily apparent; major = causing great change.

surface would have fewer features, and the drainage pattern would be less dense. These changes would be insignificant.

Impacts to the topography after mining would be insignificant because none of the topographic features is unique. Topographic changes during mining would not seriously conflict with regional land uses, and the postmining topography would support anticipated land uses. The restored land surface would approximate the original contours but would contain fewer topographic features. The basic drainage scheme would be retained but would be less dense. This would result in increased erosion until the drainage network reached equilibrium.

Changes in topography resulting from construction of the proposed transportation corridor would be confined to a long, narrow band. Topographic features within this band would be leveled or filled to accommodate a road surface which would not exceed 7 percent in grade. Although gullies and arroyos within the corridor would be altered, culverts would be installed to facilitate drainage across the right-of-way. Thus, the basic drainage network would not be significantly changed. Local features located within the corridor that are higher than final road grade elevations would be irreversibly altered.

The width of the band that would be disturbed by road construction would vary considerably. Much of the alinement across the Ute Mountain Indian Reservation crosses terrain that is flat to slightly sloping. Probably disturbance along this segment would be limited to 125 feet in width. Areas of more rugged terrain would result in disturbances of 450 feet or more in width. The corridor width across public and privately owned lands would vary from 225 to 450 feet.

There would be fewer steep slopes over the entire permit area after mining. These postmining changes in slope distribution (summarized in the following table) would result in reduced peak flows in the drainage areas, thereby increasing infiltration and generally reducing erosion except in the Younger pit area, where long, relatively steep slopes would result in increased erosion, rilling, and gullying.

	Slope interval (percent)				
	0 - 5	6 - 10	11 - 15	16 - 20	Over 20
Percentage of permit area within slope category:					
Premining	14	36	31	12	7
Postmining	34	27	21	16	1
Difference	20	-9	-10	4	-6

B. GEOLOGY

Changes in the geology would be insignificant. Mining would remove an average of 326 feet of overburden and interburden and 56 feet of coal over about 984 acres. The replaced overburden would be a relatively featureless, partly

recompacted mixture averaging about 391 feet thick. Approximately 66 million tons of coal would be mined.

Overburden to be removed during mining ranges from about 30 to 400 feet in thickness, and averages 160 feet thick over the minesite. The three interburdens range from 59 to 148 feet, 15 to 92 feet, and 0.4 to 33 feet thick, with an average total thickness of 166 feet. The shale and sandstone interbeds of the present overburden and interburden would be replaced by a relatively featureless, partly recompacted mixture averaging about 391 feet thick because of bulking.

Mining would also remove an average of 56 feet of coal (70 million tons) from four separate coal beds. The total 70 million tons is about 4 percent of the 1.75 billion tons of strippable coal in the San Juan River region. A minewide average of 5.8 feet of overburden and interburden would be removed for each foot of coal mined.

The overburden is predominantly shale and siltstone with sandstone lenses. Overburden inhibitive to plant growth occurs mainly at depth. Two types occur: (1) fine-grained material with equivalent soil textures of silty clay or clay, which restricts root development and/or decreases rainfall infiltration, and (2) material whose chemistry is deleterious or potentially deleterious upon weathering. Textural analysis of the cores from three test holes indicated some clayey material that is too impervious to serve as a suitable plant growth medium. Chemical analyses of cores also showed some high SAR and high EC.

Though much of the unsuitable overburden is at depth and would be redeposited at approximately the same depth by truck-and-shovel spoiling, adequate dilution of deleterious material might not occur. Therefore, SJCC would be required to place 4 feet of suitable overburden above run-of-mine backfill as an acceptable base for the replaced topsoil.

C. HYDROLOGY

Impacts on the hydrologic system would range from insignificant to moderately significant during the life of the mine, decreasing to insignificant after some long period (greater than 75 years). Changes in quantity and quality of both surface and ground water would be minor and would not interfere with anticipated postmining grazing and wildlife uses of the area. The proposed transportation corridor would not impact the hydrologic system.

During mining, runoff characteristics and sediment discharge would change over the disturbed area. Sediment would be trapped by berms around the disturbed area, unless a storm greater than the 10-year, 24-hour storm occurred. Dewatering would lower the water level in the coal aquifers up to 4.75 miles from the mine. Pumping from a deep well for potable water could lower the potentiometric surface of the Point Lookout Sandstone as much as 100 feet up to 5 miles from the well. About 130 acre-feet of water would be used at the mine each year.

After mining, it would take less than a year for the potentiometric surface of the Point Lookout Sandstone to recover, and some long period (greater than 75 years) for the water level in the restored coal overburden (spoil) aquifer to reach a normal position. Surface-water quality would be about the same as at present. Total surface-water discharge and sediment yield would likewise be about the same as at

present but, because of small changes in the location of the drainage divide, would be distributed slightly differently. The ground water would be of lower quality, but would still be acceptable for the anticipated postmining grazing and wildlife use.

Surface water.--Continuous changes in runoff characteristics and sediment discharge would occur during mining because of changes in the location of diversions and other ditches and the destruction and reconstruction of drainage channels as mining progresses. Scour and erosion could result in considerable sediment yield in the Younger pit area, where long, relatively steep slopes are proposed. Both New Mexico and Federal regulations require that all surface runoff from affected lands must pass through sedimentation ponds or other control structures during mining. However, after mining, once these structures are removed, sediment would no longer be trapped by them and so would leave the permit area.

Runoff could increase owing to loss of soil structure during soil removal and replacement. However, this potential increase should be offset by an overall postmining slope reduction across the permit area. Soil structure would gradually re-form over time, and vegetation (after successful reclamation) would retard surface flows so as to control runoff at approximately the premining levels. Individual drainage-basin areas would be changed slightly by topographic changes, especially Montoya Arroyo, Manuel Arroyo, Northgate Arroyo, and Little Cinder Gulch (a tributary to Cinder Gulch). Montoya Arroyo and Northgate Arroyo would probably have smaller postmining drainage areas and Little Cinder Gulch and Manuel Arroyo would have larger postmining drainage areas.

Runoff in the arroyos crossed by the proposed transportation corridor should not be affected. Culverts would be used for the larger arroyos and the small arroyos have very little runoff.

Water quality would be adversely affected temporarily during construction of the proposed haul road. Blading, leveling, and other earth-moving activities would disturb and alter drainages and arroyos intersected by the corridor. Such disturbance would increase erosion and add to the drainage sediment load. This sediment could eventually reach the La Plata and San Juan Rivers.

Construction of the bridge across the La Plata River also would temporarily affect the river's water quality. Equipment needed for bridge construction would at times need to be in the river, and would cause mud to be churned up from the river bed. The muddied water would move downstream for a unknown distance.

Erosion from disturbed arroyos and drainages would decrease with completion of the haul road and revegetation of slopes. Neither the quality of water nor flow in the La Plata River would be affected once the bridge is constructed.

After mining and reclamation are complete, surface-water flow and quality, especially from the Younger pit area, would decrease somewhat and sediment discharge from the total mine study area would increase over premining conditions.

Ground water.--Development of the proposed La Plata mine would impact the ground-water resources of the area in four ways: (1) mining would remove the coal aquifers and replace them with unconsolidated overburden (spoils); (2) water levels in the coal aquifer adjacent to the mine would be lowered as a result of seepage into the open pit; (3) the head in the Point Lookout Sandstone would be lowered in the vicinity of the mine as a result of pumping water to supply the mine; and (4) the quality of the ground water in the coal aquifer would be reduced as it flows through the replaced spoils.

None of these impacts is considered significant, however, because: (1) the replaced spoils would form an aquifer with hydrologic properties about equal to those of the coal; (2) the few existing wells would still be able to supply sufficient water despite the lowered water levels, and other, albeit deeper, ground-water sources are available to replace any wells that go completely dry; (3) should any wells go dry, SJCC would be required to replace the water from them; (4) the head in the Point Lookout Sandstone would still be above the top of the aquifer; and (5) the ground-water quality would still be suitable for watering livestock, the only current use.

Removal of coal aquifer.--Mining at the La Plata mine would remove the coal aquifers over about 934 acres. These aquifers, which total an average 56 feet in thickness and are the principal source of shallow ground water in the area, would be replaced by the mixed shale, siltstone, and sandstone of the Fruitland Formation.

Rahn (1976) found that the permeability of a replaced spoil aquifer depends on the method of its emplacement. Replaced strip-mine spoil is composed of a nonhomogeneous mixture of clay-to gravel-size grains. Where the spoil has been emplaced by a dragline, this material is loosely compacted. Frequently, the coarsest grains roll down the spoil piles and form a layer of coarse rubble at the base. This results in a relatively permeable aquifer with a zone of higher permeability at the base. Spoil material emplaced by trucks, bulldozers, and/or scrapers, on the other hand, is more compacted and has a lower permeability. Rahn (1976, p. 27) reported an average permeability of 4 gallons per day per square foot for spoils emplaced by bulldozer-scraper. He concluded that, all other things being equal, bulldozer-scraper-emplaced spoils have a permeability about the same as the natural aquifer.

Mining at the proposed La Plata mine would be by truck-shovel operations. Therefore, the permeability of the replaced spoil probably would be about the same as that of the undisturbed overburden. Because the permeability of the coal is dependent on secondary features--such as joints (cleats) and structure--rather than on intergranular openings--as in the overburden and the spoil--it is hard to compare permeabilities. Nevertheless, it appears that the permeability of the spoil should be about the same as that of the undisturbed coal.

Lowered water levels.--Using a computer model based on equations developed by McWhorter (1981) for a steady-state confined flow to a line sink, SJCC has calculated that inflow from the coal into the open pit would range from zero inflow until 2004 to 11,646 cubic feet per day (60 gallons per minute) in 2016. This inflow would create an ovoid area of lowered water levels in the coal aquifers. The maximum zone of influence from the pit seepage would occur about 1 year later. For coal seam No. 1, the distance would be about 4.75 miles to the south; for coal seam No. 2, the distance would be about 1.5 miles; for coal seam No. 3, the distance would be about 0.67 mile.

The equations used to calculate pit inflow and drawdown in the aquifers were designed for aquifers having certain hydraulic characteristics and for certain types of flow. However, these assumed conditions do not all occur at the minesite. For instance, the coal is not isotropic nor is the aquifer dewatered instantaneously. For this reason, and because any assumptions made to analyze the effects of pit inflow were worst-case assumptions, the results of calculations using these equations represent a "worst-case analysis." The zone of influence resulting from mining could be less than the distances described above.

The water that seeps into the pit would be pumped to a lined 9-acre-foot mine facilities pond where it either would evaporate or be used for dust suppression. None of the water would be discharged to local streams.

Point Lookout aquifer.--While in operation, the proposed mine would require 130 acre-feet of water per year. Of this, 3.5 acre-feet would be potable water, 50 acre-feet would be utility water, and the rest would be for dust control. Most of this water would be supplied by a well tapping the Point Lookout aquifer at a depth of about 4,000 feet. (Some water for dust control would come from inflow to the mine pit.) The applicant has applied for an appropriation of 200 acre-feet for this well from the New Mexico State Engineer's Office.

Pumping the well continuously at about 120 gal/min for 32 years would lower the head in the Point Lookout aquifer about 100 feet at a distance of 5 miles, and less than 10 feet at a distance of 10 miles. However, because the well would be pumped continuously only during extended dry periods, these figures represent worst-case estimates. Most of the time pumping would be intermittent, as demand occurs, allowing the head to recover during periods of no pumping. Therefore, the actual decline in head would be less.

At present, no wells in the area pump water from the Point Lookout aquifer.

Once mining has ended, the heads in the various aquifers would start to recover. For the Point Lookout aquifer, in which the decline in head represents a loss of pressure, recovery should occur rapidly, with only an insignificant amount of decline left after less than a year. The coal and spoil aquifers, on the other hand, would take much longer to recover completely. As mining progresses and spoils are placed in the mined-out pit, ground water would start seeping into the spoils from the sides of the pit as well as percolating down through the spoils from precipitation. Because ground water moves very slowly through coal and spoils (several tens of feet per year), it may take as many as 100 years for the water level in the coal and spoils aquifers to fully recover.

About 27 acre-feet per year from the La Plata River alluvium is expected to flow into the spoils as recharge for an unknown length of time (greater than 75 years).

Water quality.--Overburden is broken up during both its removal and its replacement as spoils. As it becomes saturated, fresh surfaces are exposed to the ground water moving through it. Because this ground water is not saturated with respect to any mineral constituents, it is able to dissolve many of the newly exposed minerals. Therefore, ground water in the spoils would be significantly more mineralized than is the ground water in the adjacent aquifers. Rahn (1976) and Van Voast (1974) have found that ground water in spoils in the Powder River Basin contains increased amounts of calcium, sulfate, magnesium, manganese, and TDS. TDS in the spoil water at the La Plata site may increase from the present range of from 855 to 5,130 mg/L to a range of from 1,500 to 6,000 mg/L. However, such an increase would not be significant because water containing TDS within this latter range is still suitable for watering livestock, the only expected use of ground water in the permit area.

A study made for the proposed Rochelle mine in Wyoming showed that it would take the equivalent of five pore volumes of water moving through the spoils to dissolve out the newly exposed minerals and so to restore the water to a quality comparable to that of the adjacent aquifers. It was further estimated that this process would take more than 11,000 years. The change in water quality in the spoils should, therefore, be considered permanent.

As the ground water moves southward out of the spoil, it would gradually improve in quality. Because ground water moves so slowly, ion exchange would occur and other ions would become adsorbed to the fine particles in the aquifer. Also, some dilution would occur as the plume of ground water from the spoils dissipates and is mixed with ground water from the undisturbed aquifer.

Recharge.--Mining and reclamation at the proposed La Plata mine would have little, if any, effect on recharge. The coal outcrops, where the recharge to the coal aquifers occurs, would be removed, but recharge through the spoils should be about equal to the recharge that now occurs. The process of removing and replacing this overburden would break up the more consolidated beds, which would increase the permeability of the material.

Alluvial valley floors.--SJCC has estimated that 7.5 acres of AVF and 8.6 acres of potential flood irrigation are located within the haul road crossing of the La Plata River valley, adjacent to the La Plata River. The entire 16.1 acres potentially could be disturbed by the proposed project; however, final road design work may show that construction activities would require the disturbance of less than the total 16.1 acres.

For the 32-year life of the mine, the AVF within this crossing would not be available for any agricultural use. Although soils would be altered, removal of the road-base materials and reclamation of the surface would permit the land to gradually return to its premining production. Construction of the crossing would not affect essential hydrologic functions of the AVF.

The only other impact to the AVF would be the diversion of an average of 27 acre-feet a year to recharge the replaced spoils. This flow would not start until the 20th year of operations, when mining has progressed to a point where the normal flow pattern is reversed, and water starts to flow from the alluvium into the coal seams and thence into the pit. This reversed flow would continue until the water level in the replaced spoil rises above that in the alluvium (about 75 years). The mean flow in the La Plata River is 23,891 acre-feet a year, so the loss of 27 acre-feet a year for recharge would constitute only about 0.1 percent of the mean annual flow.

The mine would be designed as a zero-discharge mine, and any tributaries mined through would be restored to their premining condition. Therefore, there would not be any change in the quality of the water in the AVF.

Water use.--Disruption of flow in ephemeral streams draining the permit area could have an impact on downstream water rights in the La Plata and San Juan Rivers. SJCC is purchasing sufficient surface-water rights in the area to account for any loss of flow from the mining operations or from pumping of the supply well and would secure alternative water supplies to replace any other impacted supply.

D. AIR QUALITY

Air-quality impacts resulting from, or associated with, mining operations at the proposed La Plata mine would be limited primarily to the operation and construction phases of the mine. The impacts during this time would result in increased TSP levels in the vicinity of the mine and transportation corridor. The TSP concentrations would still be well below the State and Federal standards. The location of maximum TSP concentrations would shift as mining progresses.

The expected impact of the La Plata mine on TSP concentrations was estimated by SJCC. Dispersion modeling was done by SJCC for the annual average and 24-hour average TSP concentrations. Table IV-2 presents a summary of the various particulate emissions, including fugitive dust, for the peak emission year. Figure IV-1 illustrates the increase in the annual average TSP concentrations resulting from the La Plata mine.

The maximum predicted increase in annual average TSP concentrations is about 10 μg/m^3 (table IV-3). This value, combined with a background value of 20 μg/m^3, produces an annual average TSP concentration value of 30 μg/m^3, which is well below the State and Federal standard of 60 μg/m^3. The expected increase in 24-hour TSP concentrations was modeled using several worst-case meteorological scenarios. This modeling predicted a peak increase in 24-hour concentrations of 40 μg/m^3 (table IV-3). It is unlikely that the predicted off-property TSP concentrations plus the background concentrations would exceed the 24-hour standard of 150 μg/m^3.

Concentrations of gaseous emissions due to fuel combustion at the mine, including the transportation corridor, would be expected to increase, but only marginally. Compliance with State and Federal standards should be easily attained.

Table IV-2.--Emission inventory for the proposed La Plata mine

(Data furnished by applicant)

Source	Emission factor	Operations assumption	Control factor	Annual controlled emissions (tons/yr)
Topsoil removal	1.23 lb/VMT[1]	4,190 VMT/yr	1.0	2.6
Topsoil stockpile	.152 ton/acre/yr	12 acres	0.25	0.5
Exposed areas	.152 ton/acre/yr	100 acres	1.0	15.2
Overburden drilling	1.3 lb/hole	14,554 hole/yr	0.1	1.0
Coal drilling	1.3 lb/hole	16,660 hole/yr	0.1	1.1
Overburden blasting	388 lb/blast	202 blast/yr	1.0	39.2
Coal blasting	1,377 lb/blast	83 blast/yr	1.0	57.1
Overburden removal	.015 lb/ton	24,102,000 ton/yr	1.0	180.8
Overburden dumping	.0015 lb/ton	24,102,000 ton/yr	1.0	18.1
Coal removal	.003 lb/ton	4,316,000 ton/yr	1.0	6.5
Coal stockpile	5.1 lb/acre/hr	11.48 acres	1.0	256.4
Coal dumping	.017 lb/ton	4,316,000 ton/yr	1.0	36.7
Dozers	17.5 lb/hr	36,000 hr/yr	1.0	315.0
Haul roads	2.83 lb/VMT	96,371 VMT/yr	0.5	68.2
Water trucks	0.94 lb/VMT	29,484 VMT/yr	0.5	7.0
Graders	2.24 lb/VMT	126,000 VMT/yr	0.5	70.6
Coal reloading	.003 lb/ton	4,316,000 ton/yr	1.0	6.5
Total				1,082.5

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[1] VMT = vehicle miles traveled.

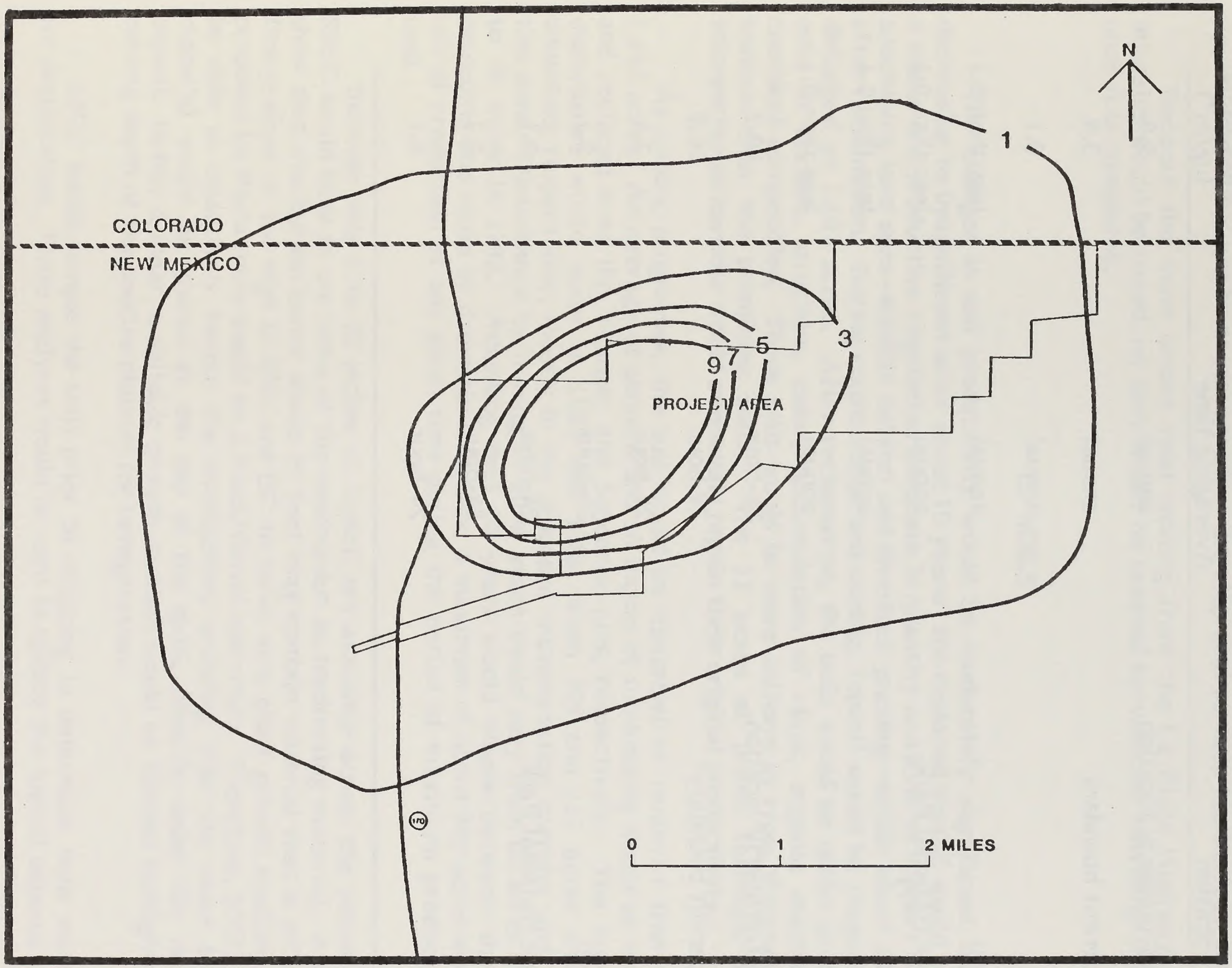

Figure IV-1.--Isopleths showing increase in average TSP concentration (in $\mu g/m^3$) resulting from mining at the proposed La Plata mine. (Furnished by applicant.)

Table IV-3.--Summary of air-quality modeling of TSP concentrations for the proposed La Plata mine

(Data furnished by applicant)

Location	Averaging time	Peak value ($\mu g/m^3$)
Highest off-property location	annual	9.9
Western permit boundary	annual	3.9
La Plata	annual	0.1
Farmington	annual	less than 0.1
Mesa Verde National Park	annual	less than 0.1
Aztec	annual	less than 0.1
Durango	annual	less than 0.1
Highest off-property location	24-hour	40.2
Western permit boundary	24-hour	26.9
La Plata	24-hour	2.4
Farmington	24-hour	0.1
Mesa Verde National Park	24-hour	0.1
Aztec	24-hour	0.2
Durango	24-hour	0.1

After the haul road is completed, fugitive dust and exhaust emissions would primarily be related to the number of trucks traveling the transportation corridor. These would vary from 7 to 11 trucks per hour, depending upon the rate of coal production at the mine. Prior to application of the chip-seal surface in the second year, SJCC proposes to use water trucks to control fugitive dust. Water application would not be necessary after the chip-seal surface has been applied.

Because the mine access road running from the La Plata Highway to the minesite would be paved, no dust would be created by vehicles traveling this road once it is completed.

E. SOILS

The changes in soil productivity would be moderately significant initially, decreasing to insignificant after about 10 years: the replaced topsoil would support a stable and productive vegetation adequate in quantity and kind to support planned postmining land uses—wildlife habitat and livestock grazing—within about 10 years after reclamation. During construction and mining, topsoil would be progressively disturbed on 1,643 acres. After reclamation, the soils would be unlike premining soils in texture, structure, color, accumulation of clays, organic matter, and chemical composition. These soils would be more uniform in type, thickness, and texture than the premining soils. The 11 acres of prime farmland in the transportation corridor would eventually regain their original productivity.

As mining progresses, the soil would be disturbed or removed from about 1,643 acres. An average of about 6 and 10 inches of topdressing would be removed and replaced over the Younger and Sundance pits, respectively. The maximum disturbance would occur in 1985 and 1986, when 505 and 127 acres would be disturbed, respectively, mostly in the proposed transportation corridor and facilities area. Disturbance by mining in other years would vary from 60 acres in 1988 to 14 acres in 1992. Assuming that 10 years would elapse between the final reseeding and reuse by domestic livestock, a maximum of about 980 acres would be out of production at any given time during the period of maximum production of coal.

Because only 6 to 10 inches of topsoil are available across the permit area, SJCC would have to use some of the overburden as topdressing material. Analyses show that overburden below about 20 feet may contain material that is either too fine-grained or too high in SAR and EC to serve as a plant growth medium. The proposed La Plata mine would be a truck/shovel operation. Therefore, SJCC would be able to selectively handle the overburden, ensuring that the more suitable material would be placed at the top of the spoil, directly under the replaced topsoil. In this manner, a suitable growth medium would be formed throughout the rooting depth of the species planned for revegetation.

SJCC would sample the soils prior to stripping to determine their suitability for reclamation. These analyses would be used to update the topsoil balance plan.

The 11 acres of prime farmland that would be disturbed for the proposed transportation corridor in the La Plata River valley would be out of production for the entire duration of mining. They would, however, be reclaimed and restored to equal or greater productivity capability after mining.

The total postmining productivity of the mine study area would probably remain at premining levels, although productivity may change locally because:

- The thickness of the reclaimed soils would be more uniform than that of the present soils, especially on areas affected by coal-seam fires, where variable amounts of clinker are exposed, and in areas of alluvial fill.
- Poorer soils, such as those with clayey texture or high sodicity, or areas with large percentages of shallow soils and exposed bedrock, would be buried or mixed with other materials to a more uniform physical and chemical composition.
- Uniformity of soil texture would be increased: clayey or sandy soils and those with well-developed argillic horizons would inevitably become mixed with other materials in stockpiles and would likely become a sandy clay loam. This would result in more uniform vegetative productivity across the disturbed area when the soils are redistributed, which may disrupt subsequent animal communities.
- Erodibility of the soils would be reduced in the steeper areas, whereas the more stable soils, such as those on uplands under grassland, would be subject to increased erosion until effectively stabilized with vegetation. However, soil losses in general would be minimal: sediment-control measures during mining would trap eroded soil materials, and proper vegetation stabilization would reduce wind erosion.

The changes in soil productivity on the mine study area would be a relatively short-term impact. During construction and mining, topsoil would be progressively disturbed or removed from and replaced on 1,643 acres. After reclamation, the soils would be unlike premining soils in texture, structure, color, accumulation of clays, organic matter, and chemical composition.

The soil-forming processes would be disturbed, resulting in the alteration of soil characteristics and, consequently, the taxonomic classification of the soils. Soil characteristics that would be affected include soil structures, argillic horizons, horizons with carbonate accumulations, soil texture, soil erodibility, salinity, productivity capabilities, biological activity, and nutrient content.

Changes in topsoil characteristics would occur in topsoil removed from disturbed areas and stored for several years before redistributing. These changes would include a decrease in nutrient content, viability of plant seeds, and soil microbial activity. Some of the stockpiles would remain intact throughout the life of the mine.

F. VEGETATION

Disturbance of vegetation on the mine study area could cause a moderately significant long-term impact during and following mining. The proposed mine and transportation corridor would progressively remove the vegetation on 1,643 acres during the 32 years of construction and mining. However, this would not conflict

with the anticipated long-term regional land uses. Potentially sodic (i.e., toxic) spoils would be covered by a minimum of 4 feet of nontoxic overburden and 6 inches of topsoil over the mine area; a diverse, effective, and permanent vegetative cover should be established on this topsoil within about 10 years after reclamation is completed. No plant species listed or proposed for listing as threatened or endangered have been documented on the mine study area.

Vegetation would be removed from 1,138 acres on the permit area and 505 acres on the proposed transportation corridor during the 32-year life of the mine. Short-term impacts associated with vegetation removal during the construction and operation phases consist of increased erosion and habitat loss for wildlife and livestock. Habitat loss would occur primarily in areas currently used as winter range for deer and as summer range for cattle. Should reclamation of the site fail, potential long-term impacts consist of a degradation of livestock and wildlife forage quality and yield, continued higher than normal levels of erosion, and undesirable species invasion on unreclaimed lands.

It is estimated that the entire mine study area would be returned to a productive state within about 10 years after mining ceases. However, long-term productivity on the reclaimed land would not return to premining levels until 23 years after the end of mining. Estimates of the time elapsed from topsoil replacement and reseeding through successful revegetation establishment of a given year's operation range from 5 to 10 years. (See appendix A, Reclamation.) An average of about 35 acres of surface would be disturbed each year. By the time mining ceases, 70 percent of the disturbed land would have been reseeded. The reestablished vegetation should be dominated by species found in the permanent seed mixtures. Most of these species currently occur on the permit area. Additional species from surrounding areas would gradually invade the reclaimed areas and become established on the reclaimed land. The reclamation plan includes steps to control site invasion by weedy species. Grassland vegetation would dominate the site immediately following reclamation. This temporary change from premining vegetative cover would not seriously affect the potential productivity of the reclaimed areas, and the proposed postmining land use should be achieved even with the changes in vegetation composition.

Increased levels of erosion and undesirable plant species invasion are likely and normal on disturbed areas prior to the successful establishment of the intended revegetation species. The applicant's proposed revegetation plan would minimize erosion on newly seeded areas through mulching and the use of cover crops. Weed infestation would be controlled as needed. The applicant would use diverse and predominantly native species of the appropriate seasonal variety to create a mosaic of shrub clusters, reestablishing the premining land uses of grazing and wildlife habitat. However, the replacement of 6 inches of suitable topsoil material and 4 feet of nontoxic material over the sodic spoil would be required to ensure the successful revegetation of the disturbed areas in this arid environment within the 10-year period. (For a more detailed discussion of overburden concerns, see chapter IV, Geology and Soils.)

SJCC does not think supplemental irrigation would be needed during reclamation for two reasons. First, BLM recently approved the revegetation of more than 200 drill sites that SJCC reclaimed without supplemental irrigation. Second, the species to be used in reclaiming the mine study area were chosen for their suitability to the climatic conditions of the area, determined in part by results to date from a reclamation study plot operated by SJCC since 1981. Therefore, SJCC does not plan to use supplemental irrigation.

The climatic record for the Western United States suggests that a severe drought could occur at least once during the mine life. Such a drought would severely hamper revegetation efforts during the drought year: lack of sufficient moisture would reduce germination and could affect newly established plants. Severe thunderstorms are common to the area in late summer and could also adversely affect revegetation efforts by causing erosion, which could remove or bury newly established vegetation. Once a stable vegetative cover is established, these storms would affect both the reclaimed and native vegetation equally.

Of the eight grazing allotments that would be affected by the proposed mine and transportation corridor, four include both private and Federal lands (Shumway Arroyo, No. 5005; Coalbank Canyon, No. 5011; Jones Canyon, No. 5012; and Farmington Glade, No. 5016); one allotment includes only private lands (Norton Flats, No. 5008) and three include only Federal lands (East Stateline, No. 5014; Coyote Hills, No. 5015; and Hartley Springs, No. 5020).

BLM grazing qualifications, commonly referred to as preference, are expressed as Federal animal unit months (AUM's) at a given percentage of Federal range. An AUM is defined as the amount of forage required to sustain one cow, or its equivalent, for 1 month. Preference may be either active or suspended. Suspended AUM's are not available to the grazing permittee but are held in his or her name until such time as forage conditions improve and the AUM's become available. Any substantial reduction of Federal acreage (public lands) available for livestock grazing within a grazing allotment may cause a reduction in preference and an adjustment of the percentage Federal range figure. A reduction in privately controlled acreage (those lands owned or leased by the grazing permittee) available for livestock grazing may also result in an adjustment to the percentage Federal range figure. Table IV-4 shows the current BLM-permitted AUM's available to the permittees of the eight grazing allotments, to what extent these AUM's would change if the preferred alternative is implemented, and the approximate long-term effect of such a change.

G. WILDLIFE

Based upon the existing information and the proposed mitigation measures, the proposed La Plata operations would not have significant adverse impacts on the regional wildlife populations. Local populations of some species would be reduced in the short term, but the reclamation plan would include features to restore and enhance habitat for most wildlife species.

As with the development of any surface mine, the proposed La Plata mine would result in numerous direct and indirect impacts to the area's fish and wildlife resources. Of the 1,643 acres scheduled for disturbance, 632 acres would be disturbed for the life of the mine (32 years). The remaining 1,011 acres would be disturbed and reclaimed in parcels averaging 26 acres per year. The proposed transportation corridor crossing of the La Plata River would disturb the riparian community to a minor degree. Facility construction and coal recovery would reduce the habitat available for wildlife, and increased human activity would increase the potential for road kills and disturbance of wildlife. Because mammal densities are low in the La Plata area, the number of road kills would also be low.

Table IV-4.--Cumulative potential impacts to BLM-permitted livestock operations if the proposed La Plata mine and all related facilities are constructed

Grazing allotment[1]			BLM-permitted AUM's available to permittee			BLM-permitted AUM's available to permittee if the preferred alternative is implemented			Approximate long-term effect of implementing the preferred alternative on current herd size
Name	No.	Percentage Federal range	Active	Suspended	Total	Active	Suspended	Total	
Shumway Arroyo	5005	73	901	198	1,099	884	194	1,078	-5 (from 247 to 242)
Norton Flats	5008	55	385	17	402	385	17	402	-2 (from 140 to 138)
Coal-bank Canyon	5011	46	283	79	362	278	78	356	-3 (from 145 to 142)[2]
Jones Canyon	5012	74	167	184	351	165	182	347	-1 (from 75 to 74)
East Stateline	5014	100	100	56	156	84	47	131	(16 percent reduction)[3]
Coyote Hills	5015	100	[4]125	0	88	[4]13	0	9	-45 (from 50 to 5)
Farm-ington Glade	5016	42	938	74	1,012	912	72	984	([5])
Hartley Springs	5020	36	[4]486	0	437	[4]482	0	433	-2 (from 225 to 223)[6]

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[1] All grazing allotments are for cattle except No. 5014, which is for sheep.

[2] Two herds.

[3] No fixed flock size.

[4] Active AUM's are currently greater than allotment. AUM's in excess of the total permitted cannot be renewed.

[5] Under a 4-year exchange-of-grazing use agreement with BLM, this permittee controls the grazing use in Farmington Glade, which is largely private land. The estimated impact on herd size, allotment-wide, is approximately 1 percent.

[6] Excludes mining in the Younger pit.

It is assumed that habitats are at or near carrying capacity; therefore, habitat reduction would affect all species. The mobile species would move to adjacent areas where competition for limited resources would result in some losses. For the less mobile species, direct mortality would be higher during land clearing and overburden removal.

Secondary impacts on the area's wildlife are also important, because mine development and demand for services would result in an influx of people to the area. New construction would further reduce wildlife habitat. Increased demand for outdoor recreation usually leads to more harrassment and illegal harvest of wildlife.

Because the various groups of wildlife are affected by mine development differently, the extent and duration of impacts to each group are discussed by group below. The mitigation measures proposed by SJCC are also explained below.

Birds.--The proposed mine operations would not physically destroy any documented raptor nests on the La Plata site. However, the proposed transportation corridor would be constructed near a ferruginous hawk nest and the construction and operation of the corridor could adversely affect nesting. Disturbance during nest building could disrupt breeding behavior and result in abandonment of the nest. If disturbance occurs during incubation, the hawks might leave the nest, exposing the eggs to an imbalance of heat and cold. Disturbance during the fledgling stage could cause the adult hawks to abandon the chicks or could result in an accident in which the young bird is knocked out of the nest. SJCC must consult with USFWS to establish appropriate buffer zones and adopt other necessary mitigation measures such as total avoidance or moving the nest.

There is a possibility that construction of the transportation corridor could also affect golden eagles perching along the La Plata River. This disturbance would not be significant, because there is already a highway in the area and perching sites are not a limiting factor in the area. The potential nesting habitat for golden eagles along Cinder Gulch is north of the permit boundary and would not be affected by mine operations.

The destruction of pinyon-juniper habitat would reduce nest sites and perch availability for some raptors. However, not all pinyon-juniper habitat within the permit area would be disturbed and the reclamation plan provides for pinyon-juniper plantings that, over time, would restore some nest and perch habitat. There would also be a short-term loss of foraging habitat, but reclaimed areas would support an abundance of small mammals for raptors. In addition, the islands of undisturbed habitat within the permit and adjacent undisturbed areas would support prey for larger raptors with extensive foraging ranges.

Impacts on game birds in the area would be insignificant, because most of these birds are associated with the La Plata River habitat, which would only be disturbed by the transportation corridor crossing. The corridor would be fenced to exclude livestock, so revegetated areas would provide good cover for birds along the riparian habitat of the river. Revegetation in accordance with the reclamation plan should create a mixture of shrubs, forbs, and grasses over large areas, interspersed with denser patches of shrubs and trees. This revegetation, coupled with the fact that not all of the habitat within the permit area would be disturbed, should restore or improve the site's capabilities for game birds. SJCC's plan to retain some water impoundments and to plant and protect cover around them should benefit transient waterfowl.

The impacts on passerines would include changes in species composition as pinyon-juniper dominated habitat is replaced by a grass-shrubland habitat. This means that reclaimed areas would be favored by species associated with the grasses and shrubs. Undisturbed pinyon-juniper and shrub-tree plantings would provide habitat for species preferring these habitats. Direct mortality would result where trees and shrubs supporting active nests are destroyed during vegetation removal.

Mammals.--Large mammals would be affected by the short-term loss of habitat as parcels of land are disturbed. Habitat dominated by pinyon-juniper and sagebrush would be reclaimed to grasses and shrubs. The marginal use of the area by antelope would not be seriously affected, and fence design would permit antelope and deer to cross permit boundaries and the transportation corridor. Because the area supports a winter mule deer herd, impacts to this capability are a major concern. During the period when reclaimed habitat is not yet productive for wintering mule deer, displaced deer would be forced to compete for less food and cover. This could lead to some losses and overuse of the food supply until revegetated areas mature. SJCC would minimize impacts on mule deer habitat by using a diverse plant species approved by the New Mexico Game and Fish Department. Shrubs valuable to deer would be included in the general seed mix as well as in scattered shrub-tree islands. In addition, not all pinyon-juniper and sagebrush habitat within the permit area would be disturbed.

Mountain lions depend heavily on mule deer as prey so the impacts on mule deer could affect lions in the area. Furthermore, the increased human activity in the area could force any mountain lions to avoid habitats traditionally hunted. These should be minor impacts since mountain lions range over very large areas and impacts on mule deer should not be significant. Although adaptable and highly mobile, local populations of medium-sized mammals may be reduced until reclamation successfully restores food and cover components.

The species composition of small mammals may change as pinyon-juniper habitat is reclaimed to grass-shrubland. Impacts on abundance would be negligible, and reclaimed lands often support increased populations owing to improved vegetative cover and diversity. Mitigation for these species could be improved if SJCC included plans to place rock or brush piles on reclaimed lands to provide additional shelter.

Reptiles and amphibians.--Direct destruction of herptofauna would occur for the less mobile species. Impacts would be minimized by restoring a diverse vegetative cover and creating small impoundments that should benefit amphibians. Although reclaimed areas would attract numerous reptiles, SJCC could improve its mitigation by placing rock or brush piles on the reclaimed lands. These features would restore the microhabitats and shelter so important to herptofauna.

Fish.--The only aquatic habitat supporting fish, the La Plata River, would not be disturbed by mining activities. Furthermore, surface runoff from disturbed areas would be controlled and sediment collection berms would minimize any addition of sediment to the La Plata River. The water supply for mine-related activities would come from new deep wells and mine seepage, and the La Plata River flow would not be affected.

Threatened and endangered species.--OSM has prepared a biological assessment pursuant to Section 7 of the Endangered Species Act, as amended. OSM's preliminary findings indicate that neither the black-footed ferret nor the peregrine falcon would be affected by the La Plata proposal. Although the proposed La Plata operation would not affect bald eagle productivity, individual eagles wintering along the La Plata and adjacent habitat may be disturbed. To avoid possible abandonment of traditional roosts, SJCC would have to coordinate with USFWS to develop buffer zones, restrict disturbances, and so forth. The USFWS response to OSM's assessment is included as appendix F.

H. LAND USE

The proposed La Plata mine would have insignificant effects on the regional land-use patterns. Mining operations and the proposed transportation corridor would preclude livestock grazing on approximately 1,643 acres. Livestock grazing and wildlife use would return to near premining levels about 10 years after completion of reclamation. About 11 acres of prime farmlands would be removed from production by the transportation corridor for the life of the mine.

The major past and present uses of the La Plata mine study area and adjacent areas are cattle and sheep grazing, wildlife habitat, gas production, hunting, woodcutting, and, along the La Plata River, irrigated farming. There are about 11 acres of prime farmland within the mine study area, where the haul road would cross the La Plata River, that would be removed from production for the life of the mine.

The major adverse environmental impacts of the proposed La Plata mine on land use would be the reduction of livestock grazing, loss of wildlife habitat, curtailment of gas exploration, and loss of public land for recreation activities. Owing to BLM's requirement for livestock underpasses, the proposed transportation corridor would not restrict movement of sheep and cattle from one area to another. Development of the proposed La Plata mine would affect livestock grazing on eight grazing allotments--four on the permit area and four on the transportation corridor (table IV-4). However, only the Coyote Hills and East Stateline grazing allotments would be significantly impacted by the development. The herd on the Coyote Hills allotment would be reduced 90 percent and the herd on the East Stateline allotment would be reduced 16 percent. None of the other herds would be reduced by more than about 2 percent.

SJCC would compensate grazing permittees if any range improvements in which the permittees have an interest are impacted by the construction or operation of the proposed mine or associated facilities. If SJCC and a grazing permittee cannot reach an agreement on the amount or type of compensation due the grazing permittee, a BLM-authorized officer would act as mediator for the parties in determining the value.

SJCC would contact any holder of a right-of-way within the permit area at least 90 days before the holder's right-of-way would be disturbed or crossed. (See chapter III, Land Use, for a list of all holders of a right-of-way.)

Use of the land for 32 years as a mine, and reclamation of the land after mining, would not conflict with any regional, local, or Federal land-use plans or policies.

I. SOCIOECONOMICS

The proposed La Plata mine would contribute to both beneficial and adverse social and economic changes resulting from increased population in San Juan County, New Mexico. With the exception of localized impacts in the upper La Plata valley, the impacts would be relatively minor and insignificant. Without the mine, San Juan County's population would increase from 82,946 in 1984 to 92,568 in 2006; with the mine, population would increase to 93,331. For this same period, Farmington's population would increase from 32,029 to 37,161 without the mine and to 37,553 with it; the population of the La Plata valley would increase from 842 to 1,109 and to 1,230, without and with the mine, respectively. Adverse impacts of moderate significance would occur in the areas of traffic and social well-being.

San Juan County's economy has historically been dependent on energy and mineral-resource exploration and development. Several large projects are currently in various stages of planning, development, and operations. Simultaneously, oil-and-gas related employment is declining, as is local construction employment at two nearby electric generating stations. The employment assumptions and schedules for these projects and the proposed La Plata mine are shown in table IV-5. Each of these activities would have impacts on the socioeconomic interaction in the region. The effects of these projects constitute the baseline scenario discussed in chapter III, Socioeconomics.

Project description.--The socioeconomic impacts associated with the proposed La Plata mine would start with its construction, which is scheduled to begin in 1985. Construction activities would be complete in 1986. The peak construction workforce of 250 persons would be employed in 1985. SJCC estimates initial capital construction costs to exceed $55 million (except where noted, all monetary figures are expressed in 1982 dollars). Estimated construction wages and salaries total $13 million.

Production operations would begin in 1986, with full operations to be achieved in 1987. Total annual wages and salaries would equal approximately $5.0 million for an operation workforce of 150. Annual coal production would be 1.5 million tons per year. All coal produced at the mine would be trucked via the transportation corridor to the crushing facility at the existing San Juan mine. The proposed La Plata mine would maintain stable employment and production at these levels through the year 2006.

Beginning in 2007, operations employment would increase to 400 workers, and the annual payroll would increase to $13.5 million. Production would increase to a maximum of between 3.0 and 4.0 million tons per year. This increase corresponds with a reduction in production and employment at the nearby San Juan mine. It is assumed that many of the additional employment opportunities at the proposed La Plata mine would be filled by employees transferring from the San Juan mine. Operations would continue at these levels through the remaining productive life of the mine (that is, until 2017). Thereafter, a small workforce of approximately 10 employees would be employed to complete reclamation work at the site.

Employment.--Development and operation of the proposed La Plata mine would generate demands for secondary or indirect service employment. The employment impact associated with the proposed La Plata mine, both direct and indirect, would peak at 411 in 1986. This period corresponds to the completion of construction and initial production operations. Total project-related employment

Table IV-5.--Employment and production projections for coal mines and other major projects in San Juan County, New Mexico, 1985-2006 (selected years)

(Sources: Adapted from Fred C. Hart Associates, Inc., 1983b, based on numerous sources, including New Mexico Energy Research and Development Institute, 1983; State of New Mexico, Energy and Minerals Department, 1982; and Bureau of Land Management, 1983a and 1983b)

	1985			1990			2000			2006		
	Employment		Production (million tons/yr)	Employment		Production (million tons/yr)	Employment		Production (million tons/yr)	Employment		Production (million tons/yr)
	Construction	Operation		Construction	Operation		Construction	Operation		Construction	Operation	
Mining projects												
La Plata	125	125	0.0	---	150	1.5	---	150	1.5	---	150	1.5
Arch Minerals	100	---	0.0	---	264	3.0	---	493	5.6	---	493	5.6
Black Lake	---	---	---	---	---	---	---	220	2.5	---	220	2.5
Bisti	---	---	---	---	132	1.5	---	220	2.5	---	220	2.5
Burnham	---	80	1.0	---	200	2.5	---	360	4.5	---	360	4.5
Firerock Well	---	---	---	100	---	0.0	---	308	3.5	---	308	3.5
Gallo Wash	50	106	1.3	---	264	3.0	---	264	3.0	---	264	3.0
Gateway	100	---	0.0	---	88	1.1	---	88	1.1	---	88	1.1
Navajo	---	565	7.0	---	565	7.0	---	565	7.0	---	565	7.0
San Juan	---	425	4.3	---	425	4.3	---	425	4.3	---	225	1.5
Subtotal mining projects	375	1,301	13.6	100	2,088	23.9	---	3,093	35.5	---	2,893	32.7
Other projects												
Animas-La Plata Project	201	---	NA[1]	877	---	NA	---	24	NA	---	24	NA
Four Corners Generating Station	40	1,200	NA	---	1,200	NA	---	1,200	NA	---	1,200	NA
Navajo Agricultural Products Industry	---	936	NA	---	1,800	NA	---	1,800	NA	---	1,800	NA
New Mexico Generating Station	85	---	NA	1,080	200	NA	---	900	NA	---	900	NA
Oil and gas	---	3,700	NA	---	3,700	NA	---	3,700	NA	---	3,700	NA
San Juan Generating Station	---	85	NA	---	980	NA	---	980	NA	---	980	NA
Star Lake Railroad	300	---	NA	---	38	NA	---	38	NA	---	38	NA
Other (ConPaso Railroad)	250	---	NA	---	20	NA	---	20	NA	---	20	NA
Subtotal other projects	876	5,921	NA	1,957	7,938	NA	---	8,662	NA	---	8,662	NA
All projects												
Total all projects	1,251	7,222	NA	2,057	10,026	NA	---	11,755	NA	---	11,555	NA

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[1] NA = not applicable.

would then stabilize at 389 jobs through 2005. It is projected that total employment impact would increase to 780 when the direct employment increases in 2006 (table IV-6). Most (60 percent) of the employment opportunities generated by the proposed La Plata mine would be filled by existing residents of San Juan County. Workers commuting on a daily basis, primarily from Colorado, are expected to fill the remaining positions. The employment effects of the proposed La Plata mine represent 1.2 and 2.0 percent increases over the baseline employment projections of 33,630 and 38,599 in 1985 and 2006, respectively.

Income.--Direct and indirect employment associated with the proposed La Plata mine would have a beneficial impact on San Juan County personal income. Total annual earnings resulting from the project would exceed $16 million ($6.7 million direct and $9.4 million indirect) between 1986 and 2005. This would be the equivalent of 2.3 percent of total 1980 San Juan County personal income. Beginning in 2006, total annual earnings are projected to exceed $32.5 million.

Population.--The proposed La Plata mine is projected to generate minor population impacts, because 60 percent of the total jobs are expected to be filled by local residents. San Juan County population with the mine is projected to increase from 83,247 in 1984 to 93,859 in 1995, and then to decline to 93,331 in 2006. This is approximately 380 persons more than the population projected without the mine through 2005 and 760 persons more than the baseline projection for 2006 (table IV-6). The entire additional impact of the mine in 2006 would not be reflected in increased population in the county. Rather, much of the increment would reflect population associated with employees of the San Juan mine that are expected to transfer to the La Plata mine when the San Juan mine reduces its production. Although the net population impact in 2006 would be limited, there would be some relocation of residents from other parts of the county to the La Plata valley.

The projected population of Farmington would increase by 392 persons from 1995 to 2006 owing to the proposed La Plata mine. The La Plata valley would experience a mine-related projected population increase of 60 persons through 2005. An additional 60 residents associated with the proposed La Plata mine are expected in 2006. The remainder of the population impact would be distributed among Aztec and the other communities and rural areas of San Juan County. A limited number of persons would be associated with employees commuting to the mine from southern Colorado.

These impacts would be insignificant, accounting for only 4.4 percent of the total population growth projected for San Juan County between 1982 and 2006, and would represent less than 1 percent of the total projected county population. The localized impacts of the mine would be more noticeable in the La Plata valley, increasing population by 6.9 percent in 1985 and 10 percent in 2006. This would lead to increased population density and changes in the rural nature of the valley. The primary periods of growth associated with the proposed La Plata mine would coincide with periods of relatively low population growth or declines in the county. Thus, the effects on community facilities, services, infrastructure, and housing associated with the population increases would occur at times of potential excess capacity or underutilization in affected jurisdictions.

Housing.--Additional housing needs resulting directly from the development of the proposed La Plata mine would occur only in 1985-86. Projected needs are 129 units in 1985 and 18 units in 1986. No additional project-related housing would

Table IV-6.--Socioeconomic variables with and without the proposed La Plata mine, San Juan County, New Mexico, 1982-2006 (selected years)[1]

(Source: Adapted from Fred C. Hart Associates, Inc., 1983b)

	1982	1983	1985	1986	1987	1990	1995	2000	2006
Project-related employment:									
Construction	--	--	250	125	--	--	--	--	--
Operation	--	--	--	125	200	200	200	200	400
Indirect	--	--	81	161	186	189	189	189	380
Total	--	--	331	411	386	389	389	389	780
San Juan County employment:									
With La Plata mine	33,325	32,167	32,601	34,041	35,354	38,961	36,693	39,373	39,379
Without La Plata mine	33,325	32,167	32,270	33,630	34,968	38,572	39,304	38,984	38,599
San Juan County population:									
With La Plata mine	84,217	82,743	83,247	85,327	87,277	92,611	93,859	93,526	93,331
Without La Plata mine	84,217	82,743	82,946	84,936	86,898	92,229	93,477	93,144	92,568
Net	0	0	301	391	379	382	382	382	763
Farmington population:									
With La Plata mine	32,707	31,920	32,187	33,296	34,336	37,181	37,846	37,669	37,553
Without La Plata mine	32,707	31,920	32,029	33,090	34,137	36,980	37,645	37,468	37,161
Net	0	0	158	206	199	201	201	201	392
La Plata valley population:									
With La Plata mine	877	836	890	959	1,012	1,160	1,195	1,186	1,230
Without La Plata mine	877	836	842	897	952	1,100	1,135	1,126	1,109
Net	0	0	48	62	60	60	60	60	121
Aztec population:									
With La Plata mine	5,729	5,614	5,661	5,826	5,977	6,392	6,489	6,463	6,458
Without La Plata mine	5,729	5,614	5,630	5,784	5,937	6,352	6,449	6,423	6,378
Net	0	0	31	42	40	40	40	40	80
Cumulative incremental housing need:[2]									
With La Plata mine	0	0	129	280	1,046	3,075	3,367	3,367	3,367
Without La Plata mine	0	0	0	133	899	2,928	3,220	3,220	3,220
Net	0	0	129	147	147	147	147	147	147
Cumulative enrollment increase, Farmington Municipal School District:[3]									
With La Plata mine	10	-185	-109	169	426	1,131	1,296	1,335	1,317
Without La Plata mine	10	-185	-158	105	364	1,069	1,234	1,273	1,194
Net	0	0	49	64	62	62	62	62	123

[1] Estimated annual average figures.

[2] Additional housing needs are assumed to occur when local population exceeds the previous high population. As population declines, for example from 1995 to 2000, excess housing supplies are translated into increased vacancies which must be absorbed prior to additional housing needs occurring.

[3] Enrollment increases are estimated at 22 percent of the total estimated population increase within the school district's boundaries.

be needed in 2006 since projected baseline population declines beyond 1995 imply increased housing availability. The vacancy rate in the county currently is 6 to 8 percent. Therefore, the 147-unit housing need for the La Plata project should primarily be met by the existing housing supply.

The baseline scenario shows major new housing needs occurring in the 1986-90 period. A total of over 2,700 units would be needed (table IV-6). Since there is some lead time associated with housing supply, this situation implies a gradual need to build additional units over the entire 1984-90 period. If construction over this 8-year period occurred at a constant rate, approximately 365 units per year would be needed to meet baseline demand. This rate is about half of the rate of additions that occurred between 1970 and 1980 in the Farmington-Aztec-Bloomfield area. Thus, the housing industry should be able to meet both the baseline and incremental demands associated with the proposed La Plata development.

Education.--The Farmington Municipal School District is currently at capacity with a present enrollment of 8,000 students. Development of the proposed La Plata mine would result in approximately 60 additional students enrolling into the district. This would occur in 1985-86, with no additional increases thereafter. The additional enrollment would occur prior to the completion of recently funded facilities. However, because total enrollment in the district is projected to decline during this period, the proposed La Plata project would not exacerbate existing capacity conditions (table IV-6).

Under the baseline scenario, enrollment in the Farmington School District would increase to almost 9,500 by 1990. This is approximately a 19-percent increase from current conditions. Additional funds available after a recent bond approval will be used to replace approximately 50 portable classrooms currently in use and to allow for upgrading of administrative facilities; these funds will not provide for the expansion of facilities needed to accommodate projected growth over the next decade. However, revenue surpluses are projected during this period, and the school district is, therefore, expected to be able to provide for additional growth in student enrollment.

Public services and infrastructure.--With the possible exception of local highways, the proposed La Plata project would cause no significant burden on public services and infrastructure. The peak population increase from the proposed La Plata mine (391 persons in the county in 1985) would not generate any additional strains on existing infrastructure and service capacities. Furthermore, the La Plata population increment would decline slightly in 1986 and would remain constant thereafter until 2000. Thus, it would not contribute significantly to the growth projected to occur from 1985 through 1990.

The baseline scenario plus the effects of the proposed La Plata project should generate no significant problems in the jurisdictions' provision of major public services and infrastructure as long as water and sewer system improvements currently underway in Bloomfield and Aztec are completed on schedule. The projected baseline growth rate is sufficiently slow over the analysis period to allow other public services to remain adequate. However, it is possible that the rapid growth projected in the late 1980's under the baseline might lead to some minor short-term public service constraints; none of these is considered significant.

Public finance.--As discussed in chapter III, baseline public finance conditions are generally favorable, resulting from the planned construction and operation of the New Mexico Generating Station, continued oil-and-gas production revenues, and a limited need for additional public capital expenditures. These generally favorable conditions would persist with or without the La Plata mine. The following revenues would be generated by the proposed mine:

- increased property taxes for San Juan County and the Farmington Municipal School District, based on increased assessed valuations (1) on capital expenditures of over $165 million (1981 dollars) and (2) on the value of annual coal production;
- increased general bonding capacity and potential debt service/capital improvement funds for the county and school district of 4 and 6 percent, respectively, as the result of increased assessed valuations;
- increased local and State gross receipt taxes (the major operating-fund revenue source for Farmington and Aztec), as the result of direct purchases by the mine (SJCC estimates that up to 12 percent of the major capital purchases would be made locally);
- increased local and State gross-receipt tax collections based on the value of annual coal production and the local expenditure of mine employees' wages and salaries, as well as the "secondary" or multiplier effect of such expenditures; and
- increased revenues to the State in the form of severance, resource excise, and conservation taxes, as well as the State's share of Federal royalty payments. SJCC estimates these revenues would average $3.2 million (1981 dollars) per year through the year 2000.

There would also be an increase in public expenditures, principally those that are tied to population of school enrollment levels. Among the most directly affected of these would be instructional expenditures for the Farmington Municipal School District, public safety expenses for San Juan County and Farmington, and general government expenditures for the county. However, baseline population revenues are projected to keep up with needed public expenditures. Therefore, impacts on public finance should be insignificant.

Social well-being.--Issues associated with possible impacts on social well-being owing to proposed mine development were identified through interviews with local residents, local government officials, and others having an interest in the proposed project (Fred C. Hart Associates, Inc., 1983a).

Many interviewees noted the beneficial impacts of new employment opportunities. However, they also were aware of the potential socioeconomic changes that would result from the project. Employment opportunities, job stability, and the existing rural character of the valley were closely associated with a sense of positive social well-being in the study area.

Responses regarding potential adverse impacts associated with the proposed La Plata mine centered on the four issues discussed below.

Effects on BLM grazing leases.--There are eight ranchers whose grazing permits on public lands would be affected either by the proposed mine and facilities area or by the transportation corridor. The severity of impact would vary for each rancher concerned. Adverse impacts anticipated include the lack of influence the ranchers would have over decisions affecting their lifestyles and economic pursuits, their potential production losses, direct changes in their lifestyles, and lack of compensation for their losses.

Water.--Water is of major importance to residents of the La Plata valley. Specifically, with respect to the proposed La Plata mine, residents are concerned about the relationship of the mine to (1) overallocation of the La Plata River (its flow is limited and seasonal); (2) the need for and expense of piping domestic water from Farmington; (3) the general status of water rights for irrigation purposes; (4) the proposed development of the Animas-La Plata Project, which most residents strongly favor; and 5) the quality of irrigation water, which residents perceive might be adversely affected by the operation of the proposed mine. The most widespread concerns were associated with anxiety about SJCC's potential demand for domestic water, sufficient notification of such demand to allow for expansion of the system, and reasonable participation by SJCC in extending and/or enlarging the existing domestic water pipeline.

Traffic.--Numerous interviewees identified increased traffic in the upper La Plata valley and possible adverse impacts on highway safety as major concerns. As basis for their concern, residents cited recent increased traffic levels attributable to a 150-person work force that had constructed a pipeline across the valley, the generally poor condition of New Mexico State Highway 170 in the upper valley, possible increases in noise and dust levels, and anxiety over safety/hazard issues. The primary safety/hazard issues discussed were conflicts between commuter traffic and school buses loading or disembarking children, slow-moving farm vehicles, and loose livestock on the right-of-way.

The 1982 average daily traffic volume on New Mexico State Highway 170 through the upper La Plata valley was approximately 840 vehicles. The proposed La Plata mine would generate traffic increases of between 23 and 46 percent of 1982 levels on this highway. (See chapter IV, Transportation.) The additional traffic on New Mexico State Highway 173 would represent a 10 to 23 percent increase over existing traffic levels at its junction with State Highway 170.

Although not quantitatively estimated, traffic levels are also expected to increase under the baseline scenario, possibly doubling current levels by 1988-90. These increases would accompany additional residential growth in the valley and construction activity at the Animas-La Plata Project.

Hiring of Native American Indians at the mine.--The interviews indicated a degree of ongoing tension between Native American Indians and non-Indians in the county. A number of non-Indian respondents expressed opposition to quotas or preferential hiring arrangements for Indians at the proposed La Plata mine. The opposition was based (1) on the fact that the La Plata mine would be located some distance from the reservations, thereby eliminating the basis for preferential hiring practices and (2) on support of equal accessibility to job opportunities in the mine for family and friends.

At the same time, respondents associated with the Navajo Nation (either as members or employees) expressed concerns about possible discrimination against Indians and the need for jobs to reduce the disproportionately high unemployment among Indians. Sociocultural differences in values, perspectives, and behavior between non-Indians and Indians were frequently mentioned by respondents from all sectors of the study area as causes of tensions.

It would appear, therefore, that any preferential hiring practices are likely to be associated with some degree of tension. According to SJCC, qualified members of the Ute Mountain Ute Tribe would be given preferential consideration under an agreement to obtain a transportation right-of-way across the reservation. While there is no ceiling on the number of positions which could be filled by Ute Mountain Utes, a representative of the Ute Mountain Ute Tribe indicated that the tribe expects fewer than 25 of the positions in the mine to be filled by tribal members (Joe Keck, Tribal Planner, Ute Mountain Indian Reservation, Colorado, oral communication, 1983). This total would include some apprentice and entry-level positions. Furthermore, it is expected that some members of the tribe who would be employed at the mine would establish residence in San Juan County to eliminate the long commuting distances between the reservation and the minesite. With this one exception, SJCC is committed to a policy of equal consideration for all qualified applicants.

Other issues identified during the interviews were the perceived environmental impacts from the mine (noise, dust, blasting, visual) and the effect of the project on the rural character of the valley. Changes created by the mine (both physical and perceived) would occur until reclamation is completed (about 38 years). The existing rural character and quality of life in the valley are important components to the social well-being of area residents. Therefore, the impacts associated with the transition of the valley from a rural to a more urbanized environment would be moderately significant.

Opportunities for mitigation.--The issues and impacts identified in the preceeding discussion provide SJCC with an opportunity to enhance the proposed mine's benefits to the community and to minimize the socioeconomic impacts. Opportunities for mitigation involve the following areas:

Community uncertainty about the applicant's development plans.--SJCC could implement a formal procedure to notify the county and the

Farmington Municipal School District of the current status of the project and to monitor the construction and operation workforce. Semiannual reports could document the number and places of residence of the employees, any anticipated delays or accelerations of the construction schedule, changes in transportation plans, and expansion or reduction of the workforce. Such reports would reduce the uncertainty in the community regarding the mine and would assist the affected jurisdictions in their staffing and facilities-planning processes.

BLM grazing leases.--Legally, no compensation is required to existing users of public grazing lands when such lands are converted to another use (e.g., mining). Voluntary compensation could be (1) the purchase of any available leases by SJCC and allocation to the affected permittees or (2) mandatory compensation to offset production losses.

Transportation impacts.--Alternatives for mitigating transportation impacts include (1) direct financial participation by SJCC in the upgrading of New Mexico State Highway 170, (2) implementation of a ride-share program, and (3) redesigning of the work schedule and shift changes at the mine to minimize potential conflicts between its workforce and local (primarily school-bus) traffic in the valley.

Native American employment.--SJCC could implement an inservice training program on cultural differences for mine employees to ease any interethnic tensions within the labor force.

J. TRANSPORTATION

Increased road traffic owing to the proposed La Plata mine would increase the need for New Mexico State Highway 170 to be improved and upgraded. Traffic in the vicinity of the mine would increase as much as 45 percent. Therefore, the impacts to transportation in this general vicinity are considered to be significant.

Traffic would noticeably increase on New Mexico State Highway 170 between Farmington and the proposed La Plata mine. At the junction of State Highway 170 and U.S. Highway 550, the traffic would increase from 3,750 to 4,002 vehicles per day during the construction period, to 3,943 vehicles per day during the lower production period, and to 4,136 vehicles per day during the peak production period. These represent increases of 8.0, 5.1, and 10.3 percent, respectively. In the vicinity of the mine, the increases would be more dramatic--from 840 to 1,142 vehicles per day during the construction period, to 1,033 vehicles per day during the lower production period, and to 1,226 vehicles per day during the peak production period. These represent increases of 35.9, 23.0, and 46.0 percent, respectively.

The traffic would also increase on New Mexico State Highway 173. Just north of Aztec, the traffic would increase from 714 to 770 vehicles per day during the construction period, to 750 vehicles per day during the lower production period, and to 786 vehicles per day during the peak production period. These represent increases of 7.8, 5.0, and 10.0 percent, respectively. At the junction of State

Highway 173 and State Highway 170, the traffic would increase from 314 to 370 vehicles per day during the construction period, to 350 vehicles per day during the lower production period, and to 386 vehicles per day during the peak production period. These represent increases of 17.8, 11.5, and 22.9 percent, respectively.

Traffic on Colorado State Highway 140 would also increase by a maximum of about 10 percent.

Two intersections along State Highway 170 would be particularly hazardous. The traffic through the intersection of State Highways 170 and 173 would increase from 1,144 to a maximum of 1,612 vehicles per day, an increase of 40.9 percent. The traffic through the intersection of State Highway 170 and the mine access road would increase from 840 to a maximum of 1,322 vehicles per day, an increase of 57.4 percent. The increased traffic flow at these intersections would likely cause injuries or death because of increased traffic accidents. SJCC plans to build acceleration and deceleration lanes, traffic signs, and possibly a traffic light to help control vehicle movement at the mine access road entrance.

Coal from the proposed La Plata mine would be hauled by truck to the San Juan Generating Station over the private haul road. For about the first 20 years, the mine would generate enough coal to load one truck approximately every 20 minutes during an 8-hour daytime period. After that, production would increase to generate enough coal to load one truck every 15 minutes during a 16-hour period. Because the haul road is private and no coal would be hauled over public roads, there should be no impact to the public transportation system from coal hauling.

K. RECREATION

Impacts to recreation caused by the proposed La Plata mine and transportation corridor would be insignificant. The present hunting and woodcutting on the mine study area would be eliminated during construction, mining, and reclamation.

The primary effect of the proposed La Plata mine and transportation corridor on the recreation resources would be to increase the number of people seeking recreational opportunities. Developed recreation sites in the area would receive additional use, which would lead to increased vandalism and increased maintenance and repair costs.

Although the tax bases would expand, a lag between the need to expand existing facilities or to build new ones and the availability of sufficient funds to do so appears inevitable.

There are no recreational facilities, wilderness areas, or the like on the minesite or transportation corridor and the land is seldom used by the general public except for dispersed recreation, such as offroad vehicles, hunting, or sightseeing, and for cutting firewood. The facilities area, transportation corridor, and the mining operations would eliminate up to 2,942 acres of potential hunting areas if the entire area is closed to hunting. The acreage withdrawn from public use because of safety reasons could be appreciably larger.

Within 60 days of permit approval, SJCC would cut or push down the trees in the proposed facilities area and place them in windrows south of the facilities area access road. Prior to construction of the Sundance pit, SJCC would allow public woodcutting in the area west of the boxcut. Fences would be constructed at both sites to identify boundaries of woodcutting and provide safety barriers from construction and mining activities.

L. CULTURAL RESOURCES

At least 134 archeological sites are present within the La Plata mine study area. Based on the current state-of-the-art for analyzing such sites, any impacts from mining operations can be mitigated.

Both Federal and New Mexico State law require that mine permit areas be inventoried and evaluated to determine the presence or absence of significant prehistoric and historic resources and values. The National Historic Preservation Act specifies that all cultural resources that are on, or are eligible for listing in, the National Register of Historic Places in the permit area be taken into consideration if they are located on lands that are subject to licensing by the Federal government. Federal law also specifies that adverse impacts to National Register listed or eligible properties be properly mitigated.

The School of American Research and the Division of Conservation Archeology reported 134 prehistoric and/or historic sites within the mine study area. Survey methods and techniques used by these institutions are consistent with current professional standards. Impacts to all these sites can be mitigated.

Expected population growth related to coal mining doubtless would adversely affect prehistoric and historic values in the area; vandalism and pot hunting almost certainly would occur. Moreover, because archeological resource inventories prepared in accordance with current state-of-the-art may have failed to recognize some important scientific values, there exists a potential for destroying those values without study.

Because factors affecting the significance or insignificance of impacts to cultural resources will change as more is learned about the area, as sites continue to be destroyed without adequate study, and as advancements are made in archeological state-of-the-art, a final assessment of cumulative impacts to cultural resources must be considered tentative and subject to refinement.

Although thousands of prehistoric and historic sites are known to exist in the San Juan Basin, none of the 134 sites in the La Plata area should be presumed insignificant. Considered individually, some sites may not satisfy National Register criteria for significance but, taken as a group, the 134 sites could be considered very significant and eligible for listing in the National Register of Historic Places. Historically, unspectacular sites such as those found in the La Plata area (with the exception of the Morris 41 site) were not thought important enough to warrant scientific investigation; accordingly, none has been studied.

SJCC has prepared a scope of work using John Beal's background data and recommendations (Beal, 1978a, 1978b, 1979, 1982) and has arranged with a contractor to develop a specific mitigation plan for the proposed La Plata mine.

M. ESTHETICS

Impacts from noise generated by mining activities at the proposed mine and the transportation corridor are expected to be insignificant owing to the remote nature of these sites. Observations at other surface coal mines in northwestern New Mexico indicate that wildlife adapt to noise conditions associated with active coal mining.

During construction and mining, visual impacts would be insignificant because the minesite would not be visible from any major travel routes. A small section of the proposed transportation corridor would be visible where it would cross State Highway 170 and the La Plata valley. The landscape character would not be significantly changed after reclamation is completed.

Noise.--Noise levels at the site would be increased considerably by mining activities. During reclamation, noise would be generated by equipment used to regrade, till, and prepare seedbeds. However, OSM's noise impact report, written for the Rojo Caballos mine (Office of Surface Mining, 1980), indicates that the noise level at a coal mine operating a crusher/conveyor system (the noisiest elements of a mine) would not exceed 45 dBA at a distance of 1,500 feet from the source of noise. Moreover, the Noise Control Act of 1972 indicates that a 24-hour equivalent level of less than 70 dBA prevents hearing loss and that a level below 55 dBA in general does not constitute an adverse impact due to noise intrusion. OSM anticipates that noise generated at the proposed La Plata mine would be no greater than that generated at the Rojo Caballos mine. Therefore, noise resulting from mining and reclamation activities at the La Plata mine would not have any significant impacts.

Noise levels would increase during construction and operation of the proposed haul road. Construction equipment and infrequent blasting during road construction would create higher than normal noise levels. These noise levels would be evident for 9 to 11 months, the projected period of construction. During this time, the noise levels and locations of noise would continually change as construction progresses.

Explosives would be used at the La Plata mine to fragment the overburden and coal to facilitate their excavation. The air overpressure created by such blasting is estimated to be 123 dB flat. This is about the same as the airblast associated with firing a hunting rifle (124 dB) and is well below the level at which damage would occur to the nearest occupied dwelling (2,000 feet away).

Once coal hauling starts, the amount and frequency of noise would vary with the amount of travel on the road. SJCC estimates that an average of seven trucks per hour would use the road during most of the mine's life, increasing to eleven trucks per hour during the mine's peak production years. This traffic would raise noise levels along the entire corridor; however, because of the remoteness of most of the route, only the La Plata valley would be impacted by the increased noise.

Noise from the segment of the haul road and mine access road located within the La Plata River valley would be noticeable to local residents and persons traveling the La Plata Highway. Increased noises of bridge and road construction would be evident during the construction phase. Increases in present noise levels would be caused by additional traffic flows and coal-hauling truck traffic once the mining operation gets underway. Most of the increased noises would be restricted to the immediate vicinity of the haul road and mine access road. The closest occupied residence to the proposed corridor is a mobile home situated near State Highway 170. This mobile home is only 215 feet from the edge of the corridor. Persons living in this home would be the most affected by any increased noise levels. The next closest occupied residence is about 1,500 feet from the haul road. Impacts of noise at this distance would be greatly reduced.

Because of the remoteness of the site, noise would have little offsite effect. Wildlife in the area might be affected by noise; however, it is not possible to determine the extent of this impact alone and, in any case, the destruction and disruption of habitat during mining would be a greater impact. After reclamation is completed, noise would return to its present level.

Visual resources.--Visual impacts would be evident during the 32 years of mining. The proposed mine would be a sharp contrast to the existing landscape. Manmade structures with straight vertical lines would contrast with existing rolling horizontal lines. The coarse texture of the large machines and structures would contrast with the fine texture of the grass and sagebrush cover. If the equipment and buildings are of bright, reflecting colors, they would contrast with the darker, duller earth and vegetation.

Visual impacts resulting from construction of the proposed haul road would be evident in the landscape. The linear aspect of the road would conflict with the natural character of the surrounding area. However, most segments of the corridor on public lands and on the Ute Mountain Indian Reservation are in low-use (frequency of sightings) areas. This fact, as well as the existing modifications and the relatively poor scenic quality of the area, diminished the significance of the visual impacts.

The visual impact would be most noticeable at the corridor crossing of State Highway 170. The lands adjacent to the highway are privately owned, however, and are currently more intensively developed than is the Federal land. Because this area is no longer in a natural or pristine state, the change in scenery resulting from the proposed haul road and bridge would not be considered by many viewers to be a significant impact.

Most of the mine and transportation corridor would affect landscapes classified as visual resource management class IV by BLM. Because of this low rating, the visual impacts would be relatively insignificant.

After reclamation, impacts would be negligible--reclaimed terrain would be similar to the surrounding terrain. Slopes might appear smoother (less intricately dissected) than does the undisturbed terrain, and sagebrush and pinyon/juniper would not be as abundant for several years.

N. THE RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Based on anticipated production levels, the La Plata leasehold would be committed to coal production for 32 years. During this time, mining would result in the introduction of additional roads, powerlines, fences, mine structures, and associated human populations into the La Plata River valley--an area already undergoing change from rural to semi-suburban. The increase in population would create an increased demand for all public services. Overall, the open landscape would be visibly intruded more by the construction, mining equipment, haul road, and other human activities due to the increased population than by actual mining excavation and reclamation. Part of this intrusion would still be in evidence long after coal mining has ceased.

As the coal is mined, almost all components of the present ecological system, which have developed more or less harmoniously on the affected land over a long period of time, would be modified and in some cases destroyed. In partial consequence, the reclaimed land would be topographically lower, and, although it would have approximately the original contour, it would lack some of the original variety of geometric form.

During construction and operation of the proposed La Plata mine, there would be a loss of vegetation on 1,643 acres and an accompanying disturbance of wildlife habitat and grazing land. However, it is estimated that the minesite would be returned to an equivalent or better forage production capacity for wildlife and domestic livestock within about 50 years after initial disturbance. Long-term productivity would depend largely on range-management practices.

Mining would disturb parcels of mule deer winter range; reduced topographic diversity would make the area permanently less suitable for mule deer, but these areas would be suitable for antelope after successful reclamation. Despite loss and displacement of wildlife during mining, it is anticipated that reclaimed habitat would support a similar diversity of wildlife species.

Although introduced, as well as native, grasses and shrubs would be planted, the diversity of species found in undisturbed rangeland would not be completely restored in the minesite for about 50 years after the initiation of disturbance, and reestablishment of mature sagebrush and pinyon/juniper habitat for antelope and mule deer could take even longer.

There would be a deterioration of the ground-water quality in the mine area because of mining. This deterioration would probably take place over a long period of time. The water quality would still be adequate for livestock. During mining, depths to ground water would increase in the coal aquifers nearly 5 miles from the pit. Except for the immediate vicinity of the mine pit, the water levels in the coal aquifer should return to premining levels some distant period of time (probably 70 to 100 years) after mining has ceased. There would be a temporary depletion of the quantity of ground water when the pit intercepts the aquifer and the water is pumped out. There should be no permanent depletion after mining. However, it is anticipated that about 27 acre-feet a year would be diverted from the La Plata River alluvium for a very long period by flow into the mined-out area.

Mining operations and associated activities would degrade the visual resources of the area on a short-term basis. Following removal of surface facilities and completion of reclamation, the long-term impact on visual resources would be minor.

In the short term, the greatest impacts to recreation values would occur from land disturbance, increases in population, and pollution. These changes would primarily have an impact on hunting and woodcutting on the mine study area and on existing recreation facilities elsewhere. However, because reclamation would result in a wildlife habitat similar to that which currently exists, and because it appears that local recreation facilities would be increased, there should be no long-term adverse impacts on recreation.

The proposed mine would provide employment directly and indirectly to a maximum of 780 workers, thereby enhancing the long-term economy of the region. However, community services and facilities would be strained as demands from increasing populations exceed capacities. It is expected that these strains, as well as increased traffic congestion and urban crowding, would be short-term effects that would be partially offset by the declining oil-and-gas industry. In the long term, as local government revenues increase, the economic situation would stabilize at new levels of use and need.

The area currently has high unemployment because of the declining oil-and-gas industry and the ending of major construction at the two power-generating stations. The mine would provide employment opportunities for some of these individuals and should be an economic benefit to the area.

Development of mine operations and ancillary facilities would result in increased highway use to move construction workers and necessary materials to the various construction sites. All facilities developed for short-term purposes would continue to be used over the long term. The haul road may be used as a public highway after mining operations end.

Increased traffic noise and road dislocations related to construction would be short-lived--a few years. However, operation of the haul road and mine would result in longer-term noise, increased traffic conflicts, and esthetic impacts for the duration of operations.

O. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

The major commitment of resources would be the mining and consumption of 65.6 million tons of coal to be used for electrical power generation during the 32 years of mining. It is estimated that 1 to 2 percent of the energy produced would be required to mine the coal.

An indeterminable amount of clinker for aggregate would be used in the construction of mine facilities, the haul road, and access roads. Clinker deposits mined with the overburden and moved with other spoil would also be irretrievably lost.

The quality of topsoil on approximately 1,643 acres would be irreversibly changed. Soil formation processes, although continuing, would have been irreversibly altered by mining-related activities. Newly formed soil material would be unlike that in the natural landscape in surrounding unmined areas.

Such materials as steel, aluminum, and copper used for the transmission lines and in the manufacturing of mining machinery and buildings would be committed for the life of the various projects, but much of it would be salvageable upon abandonment.

Loss of life could occur due to both the mining operations and increased vehicular traffic. Preliminary accident reports from strip mines in New Mexico through the fourth quarter of 1983, as determined by the Mine Safety and Health

Administration, show there were no fatal accidents related to strip mining at these mines. Disabling accidents occurred at a rate of 2.39 accidents per 200,000 man-hours worked; nondisabling accidents occurred at a rate of 1.20 per 200,000 man-hours. This would be an irretrievable commitment of human resources.

Disturbance of all known historic and prehistoric sites on the minesite would be mitigated. Any accidental destruction of currently unknown archeological or paleontological values would be irreversible and irretrievable.

The coal-mining development would add to the loss of the small-town atmosphere and way of life. About 780 persons would be added to the area if the proposed action is approved. An additional burden would be placed on the service facilities of the area. The proposed action would only add to these problems, however, because other developments in the area will cause even greater changes.

The forage and associated grazing and wildlife habitat that the affected land provides would be lost during the period of mining and reclamation. The rough breaks habitat along the gullies and low hills, which is important for mule deer, would only be partially restored, even over the long term.

As much as 130 acre-feet per year of water would be consumed by domestic use, plant and equipment cleaning, fire control, and dust suppression. This would be a total of 4,160 acre-feet over the life of the mine. Although the quality of the ground water would be decreased, the water still would be acceptable for the anticipated postmining uses of livestock grazing and wildlife habitat.

CHAPTER V

CONSULTATION AND COORDINATION

This EIS was prepared by OSM in cooperation with BLM, which manages much of the land surface involved, and BIA, which is responsible for approval of Indian-owned portions of the right-of-way. New Mexico MMD provided the technical analyses on which much of the description of impacts in chapter IV is based.

The public is urged to comment on, and to make suggestions regarding, this draft EIS. In addition, comments are solicited from the following:

Department of the Interior:

Bureau of Indian Affairs
Bureau of Land Management
Bureau of Mines
Bureau of Reclamation
U.S. Fish and Wildlife Service
U.S. Geological Survey

Other Federal agencies:

Department of Agriculture:
  Soil Conservation Service
Department of Energy
Department of Health and Human Services
Department of Housing and Urban Development
Department of Labor:
  Mine Safety and Health Administration
Department of Transportation
Environmental Protection Agency
Federal Energy Regulatory Commission
Interstate Commerce Commission
President's Advisory Council on Historic Preservation

State of New Mexico:

Department of Game and Fish
Highway Department
Mining and Minerals Division
New Mexico Bureau of Mines and Mineral Resources
Soil and Water Conservation Division
State Engineer
State Historic Preservation Officer

Local agencies:

Board of County Commissioners, San Juan County
City of Farmington

Applicant:

San Juan Coal Company

Private organizations:

Friends of the Earth
Farmington Daily Times
Izaak Walton League, New Mexico Division
National Resources Defense Council, Inc.
Public Lands Institute
Rocky Mountain Center on Environment
Sierra Club
Wildlife Society

CHAPTER VI

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CHAPTER VII

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APPENDIX A

THE APPLICANT'S PROPOSAL

APPENDIX A
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This appendix summarizes the La Plata PAP submitted by SJCC to New Mexico MMD and OSM, including those measures proposed by SJCC to mitigate some of the impacts that would result from the mining.

A. PREMINING

If the Secretary of the Interior approves the La Plata mining plan and the transportation corridor plan, and issues a Federal permit to mine coal, SJCC would take 1.5 years to prepare its mine support facilities and build the haul road before starting coal production. A 20.5-mile coal haul road between the mine and the San Juan Generating Station would be surveyed and constructed. Surface facilities would be erected just south of the mine area (figs. I-5 and A-1) on a special right-of-way issued by BLM. They would consist of an administration building, including a change house, a main shop, and a warehouse; a ready line; a parking lot; a lube/wash building; a fuel station; a carpenter shop; storage yard; a sewage plant and pond; and electric power substations.

Temporary coal stockpiles are planned adjacent to the active pit. These would be used to store coal from the pits that is awaiting transport by haul trucks. The coal would be hauled in 140-ton trucks to the crusher facility at the San Juan mine for delivery to the San Juan Generating Station.

Power would be delivered to the mine by a 69-kV line, owned by the city of Farmington, terminating at a main substation near the southwest corner of the facilities area. All transmission and distribution lines would be designed to minimize electrocution of raptors.

Fencing in the mine lease area would be limited to a portion of the facilities area (consisting of the access road, the haul road across the La Plata valley, and the west and south side of the facilities area), the active mine areas, and the revegetated areas. The remaining areas would be left open for livestock grazing until required for mining. Haul roads from the facilities area to the pits would not be fenced, thus allowing livestock movement.

Fences would protect wildlife by conforming either with BLM specifications for "type-A" fence or with other fence-design criteria approved by the BLM Farmington area office. SJCC would notify the BLM Farmington area office by written notice at least 90 days in advance of any new fence relocations or construction on the lease.

The mine is scheduled to produce 0.6 million tons of coal during the first year of production (1986), increasing to 4 million tons per year from 2007 to 2009, then declining to 3.7 and 3.4 million tons per year from 2010 to 2015; 2.75 million tons of coal would be mined in 2016 and 2017.

The La Plata mine is anticipated to require about 130 acre-feet of water per year. Two wells approximately 4,000 feet deep would be completed into the Point Lookout Sandstone. A permit for 200 acre-feet per year would be obtained from the State Engineer. After about the year 2004, pit seepage water would start to accumulate and would be pumped to a 9-acre-foot mine facilities pond for evaporation or use to control dust.

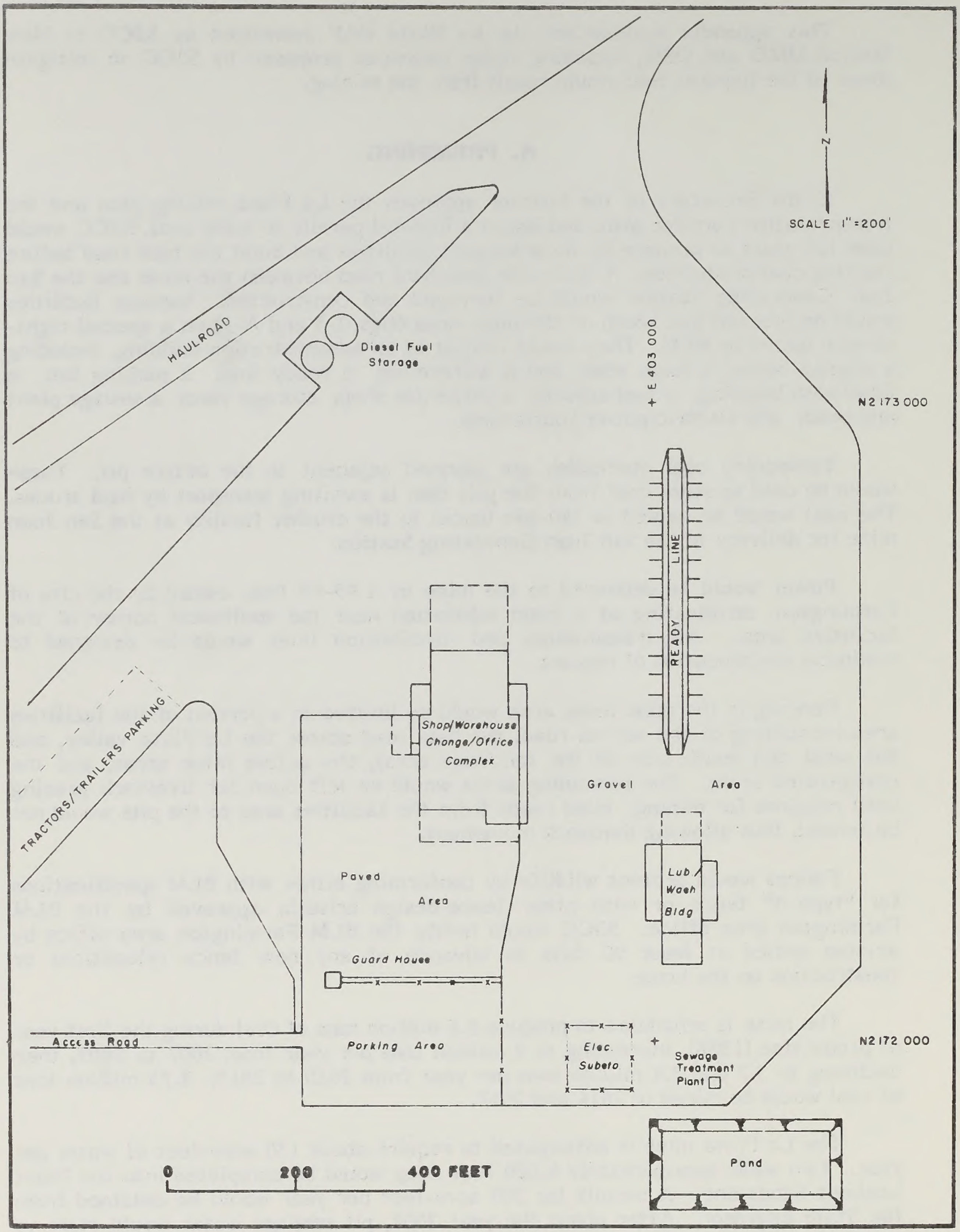

Figure A-1.--Facilities area for the proposed La Plata mine. (Furnished by applicant.)

In consultation with New Mexico MMD and OSM, SJCC has prepared a plan for monitoring the surface and ground water in the vicinity of the proposed mine. This monitoring has already started and will continue through bond release. The mine would be designed so that there would be no discharge from the disturbed areas.

Data for the proposed mine are given in table A-1.

B. MINING

The four coal seams to be mined (No. 1, No. 2, No. 3b, and No. 3a, in ascending order) average 56.2 feet in total thickness and would be mined over most of the permit area. Because of the geologic structure, the lowest seam (No. 1) would be mined first. During the 32 years of mining, extraction of the coal and reclamation of the mined area would be integrated but sequential, consisting of topsoil stripping, truck-shovel overburden removal, coal extraction, truck-shovel spoil backfilling, spoils shaping, topsoil replacement, and revegetation. The acres disturbed each year and cumulative disturbance are shown in figure A-2.

The areas to be mined are shown in figure I-4. Mining would begin at the outcrop along the northern side of the Sundance pit. The first cut would be cross-dip along the outcrop and, after 4 years, would form the box cut. Mining would then progress in the direction of the approximately 11° southeastward dip of the coal, with the overburden gradually increasing in thickness for the rest of the mining.

The La Plata mine would have a planned production life of approximately 32 years; production would slowly increase to the year 2007, hold for 3 years, and then slowly decrease for the remaining mine life. Mine closure is scheduled to begin in the year 2017, with an additional 2 years required for removal of facilities. Reclamation would continue through the year 2022.

The removal of vegetation would precede stripping. Large pinyon and juniper trees would be removed in accordance with BLM requirements to maximize the use of woodland products by the public. Topsoil would be removed by rubber-tired scrapers, or other suitable equipment, 100 to 200 feet ahead of overburden removal. Topsoil from surface facility areas, haul roads, and the initial cuts would be stockpiled until needed for final reclamation. Disturbed areas along the haul road would be reclaimed during the first year of facility construction, as soon as the road is completed. Starting in the fifth year of production, topsoil would be removed from areas scheduled for mining and replaced on shaped spoil in a continuous operation. A total of 984 acres of the mine block would eventually be stripped of topsoil.

A truck-shovel method of stripping has been chosen because of the rough terrain, to allow for maximum coal recovery, efficient overburden removal, and selective placement of suitable and unsuitable spoils material, if necessary.

To facilitate mining, both the overburden and the coal would be fragmented by blasting. Ammonium nitrate and fuel oil would be used as the blasting agent for dry conditions. In the event that wet conditions occurred, a water-gel type of explosive would be used. The diameter of the holes for an overburden shot would be 9-7/8 or 11 inches; coal blast-holes would be 4-1/2 inches in diameter. Depths

Table A-1.--Data for the proposed La Plata mine

(Data furnished by applicant)

	Affected area			
	Transportation corridor	Mine area	Facilities area	Total
Acres disturbed	505	1,011	127	1,643
Acres permitted	632	2,310	249	3,191
Average topsoil depth (inches)	---	---	---	6 to 26
Topsoil volume (bank cubic yards)	---	---	---	1,673,400

	Coal quantity
	Amount
Maximum production rate (tons/year)	4,000,000
In-place reserve (tons)[1]	71,800,000
Recoverable reserve (tons)[1]	69,700,000
Percent recovered	93.0
Average thickness (feet)	56.2

	Coal quality			
	Heating capacity or percentage content			
	Coal seam			
	No. 1	No. 2	No. 3b	No. 3a
Btu (as received)	10,700	8,600	8,800	9,500
Percentage ash (as received)	21	27	25	22
Percentage sulfur (as received)	0.7	0.9	1.1	1.3
Percentage volatiles (as received)	32.1	27.1	27.1	31.8
Percentage fixed carbon (as received)	42.0	35.2	25.3	40.2

	Overburden/interburden
	Amount
Average thickness (feet)	160/166
Range (feet)	33 to 400/110 to 290
Virgin overburden removed, including backslope (bank cubic yards)	236,427,000
Stripping ratio (bank cubic yards/ton mined coal)	3.39

Table A-1.--Data for the proposed La Plata mine--Continued

Miscellaneous	Description
Average employees	178 persons
Mine life	32 years
Haul-road length	20.5 miles
Access road	New Mexico State Highway 170
Location	Approximately 18 miles north of Farmington
Owner, operator	San Juan Coal Company

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[1] Tonnage estimate assumes 1,950 tons/acre-foot for in-place reserves.

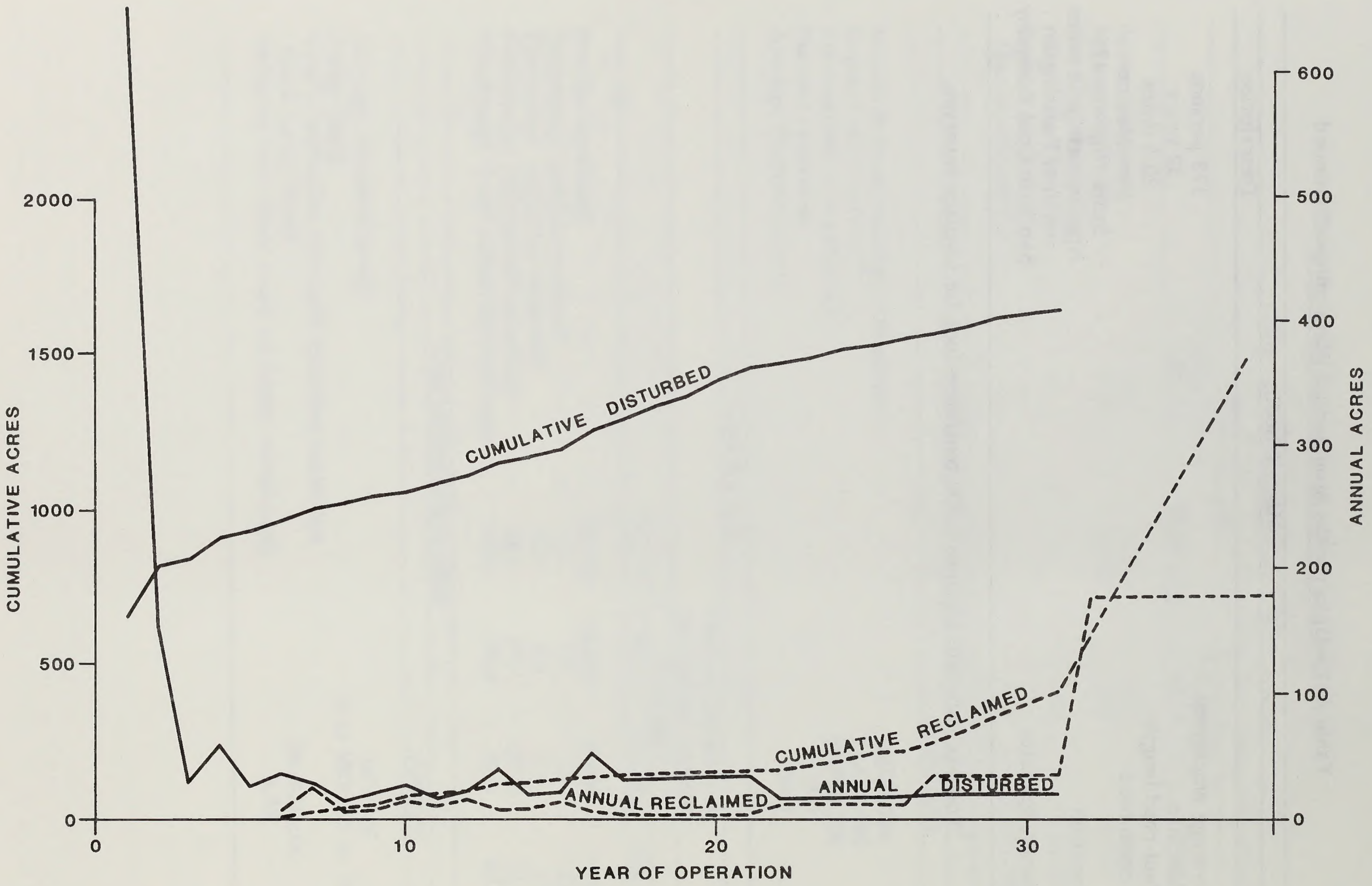


Figure A-2.--Acres disturbed and acres reclaimed during mining.

would range from 5 to 40 feet for coal, and would be about 40 feet for overburden. For overburden, a typical spacing would be 25 feet over a 300-foot by 250-foot grid. The grid for coal blasting would be 400 feet by 200 feet, with a hole spacing of 13 feet by 17 feet. To calculate loadings, the applicant has used the maximum weight formula $\underline{W} = (\underline{D}/60)^2$, adapted to limit ground vibration at the nearest occupied building.

Trucks and shovels would begin stripping the blasted overburden in 1986. The overburden would be removed initially on a cross-dipline scheme. During the last quarter of 1990, mining systems would switch to a strikeline method for the duration of the mine's life. Strips by either method would average 200 feet in width. Overburden would be removed in 40-foot-high benches. Coal would be uncovered in strips as the bench levels intersect the southerly dipping coal seams.

The cross-dipline scheme would entail an initial boxcut in which all overburden would be taken to the overburden dumpsite within the permit area. A large percentage of overburden from the first panel cut (entire cross-dip strips) would be stored in this manner for use in filling the final pit. Thus, a void for spoils from successive strikeline panels would be available in the panel previously cut.

Operation of one electric 16- to 22-cubic-yard shovel and a fleet of 70- to 120-ton rear-dump haul trucks is planned for 1986. This equipment is estimated to move up to 4 million cubic yards of overburden per year. Additions to the fleet would occur periodically as demand for coal increases in later years.

Shovels would be operated on benches maintained at predetermined elevations. Working from the highwall side of the pit, overburden would be loaded into the haul trucks for disposal via haulage ramps around the pit into previously mined-out cuts. In boxcut or initial cut areas, the material would be transported to the overburden dumpsite.

Overburden removed by the trucks from the strikeline pit would be hauled to previously mined pits along haul roads progressing up the highwall and around to the appropriate dump areas. Overburden would be dumped in mined-out areas from the crest of previously backfilled areas. The spoil dumped into the pit would rest at an angle of repose of approximately 34°. Dumping would advance along with mining. Backfilling of spoil would advance to no closer than 100 feet of mining. Each additional spoil dump would be designed to accommodate both traffic and advancing spoil from upper benches.

After all overburden and coal is removed, a typical strikeline pit would be bounded by the highwall, consisting of a series of benches, and spoil dumps on the other side. Safety benches would outline both the end wall and highwall side. By reducing the overall slope, the safety bench would increase the stability of the highwall and catch sloughing rock.

After the coal has been exposed by the overburden stripping, it would require fracturing. This would be done by either drilling and blasting or by dozer ripping. Once the coal is broken, it would be mined by shovels, backhoes, or front-end loaders. To facilitate mining, coal on steep slopes would be pushed by dozers into piles at the top of the coal seam to avoid loading on steep slopes. The top of the coal would be cleaned with dozers or similar equipment. Diluted material would be disposed of as overburden.

Coal excavated by the loaders and shovels would be dumped into a fleet of end-dump trucks. Haulage from the pit can either be transported out pit-end ramps or along highwall ramps. In all cases, the coal would be transported up the ramps to stockpiles near the pits, to await loading into the coal haul trucks for transportation to the crushing facility at the San Juan mine.

There are no active gas or oil wells within the permit area. The gas pipeline within the permit area would be relocated by the pipeline company prior to mining in its vicinity. The only gas wells within the permit area are three abandoned wells in the facilities area. A carbon dioxide pipeline running under the proposed facilites area would not be impacted.

The designed surface-water control structures would be built in accordance with the requirements of the New Mexico Regulations, Rule 80-1. The berms and ditches would be designed to carry the peak discharge from a 10-year, 24-hour storm. The mine is designed as a no-discharge operation. Therefore, no runoff from disturbed areas would leave the permit area except during a storm greater than the 10-year, 24-hour storm.

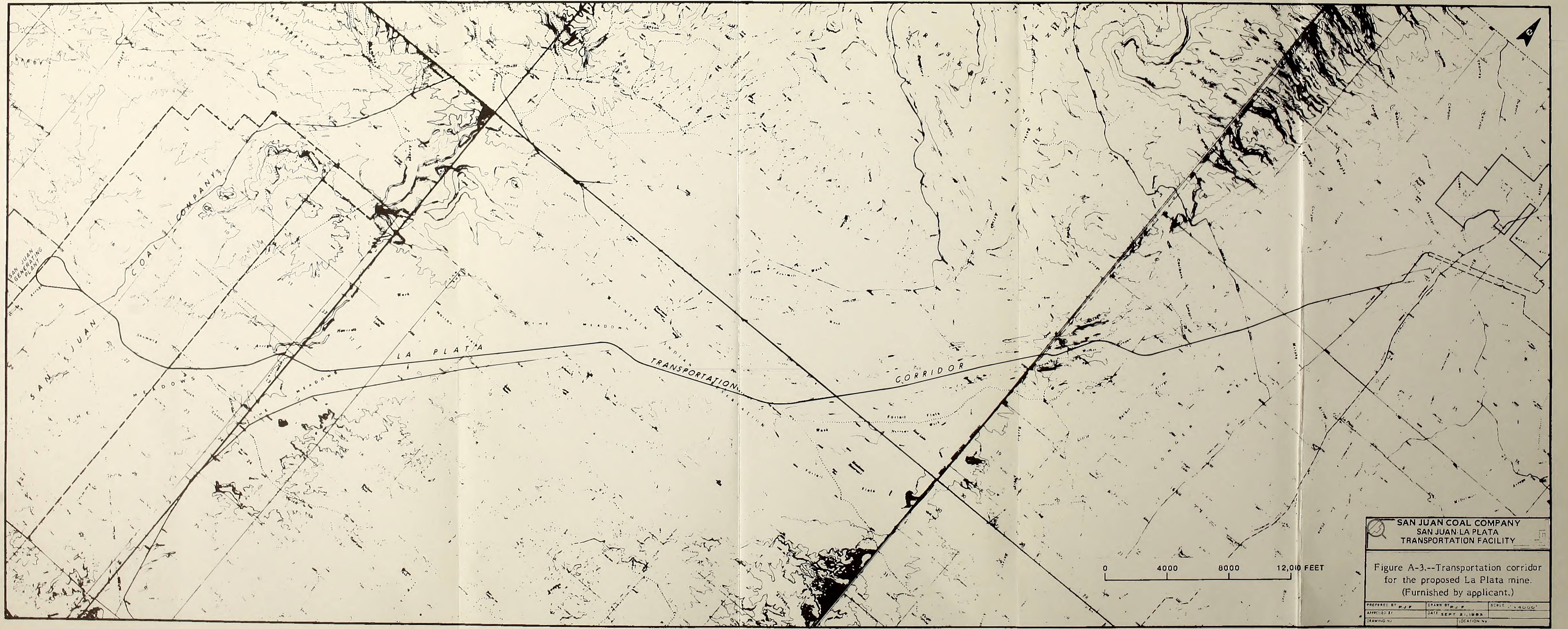
The La Plata minesite is located within a Class II air-quality control region. SJCC has indicated its intention to use best available control technology to control all mine-related particulate emissions. A meteorological and air-quality monitoring network has been operating in the vicinity of the San Juan Generating Station since 1973.

Suspended particulates would be the principal air pollutants at the site. Roads within the permit area would be sprayed with water two to three times a day to alleviate dust during dry periods. Haul roads and secondary roads would be graded as necessary, and speed limits would be imposed to reduce fugitive dust. The haul road across the La Plata valley would be chip-sealed prior to operations. Curtains and water sprays would be used to reduce dust emissions during drilling. Topsoil removal would be coordinated with mining to minimize wind erosion.

C. TRANSPORTATION CORRIDOR

The proposed transportation corridor (fig. A-3) would consist of a 20.5-mile haul road for transporting coal by truck from the stockpile at the La Plata mine to the crushing facilities at the San Juan mine. The coal haul road would be designed, constructed, maintained, and operated in a manner to prevent, control, or minimize erosion and siltation; air pollution; degradation of water quality and quantity; damage to fish, wildlife, and related environmental values; damage to public or private property; and additional contribution of suspended solids to stream flow or runoff outside the permit area.

The vertical and horizontal alignment of the haul road would be designed to ensure the safe operation of the truck/trailer units. The maximum grade for the haul road would not exceed 7 percent. For most of the route, the terrain is very flat and the grade would not exceed 1 percent. The expected vehicle weight, configuration, speed, and traffic volume would be considered in the design of the horizontal curves. The curves would be superelevated as specified by design standards for expected speeds and degree of curvature. The layout of both the horizontal and vertical curves would comply with American Association of State Highway Officials standards or other recognized design standards.



SAN JUAN COAL COMPANY
SAN JUAN-LA PLATA
TRANSPORTATION FACILITY

Figure A-3.--Transportation corridor for the proposed La Plata mine. (Furnished by applicant.)

PREPARED BY P.J.F.
DRAWN BY P.J.F.
SCALE 1" = 4000'
APPROVED BY
DATE SEPT 21, 1985
DRAWING No
LOCATION No

Suitable soils for revegetation would be salvaged prior to disturbance for haul-road construction. Material removed for haul-road construction would be stockpiled.

Side slopes in road cuts would be designed not to exceed 1v:1.5h in unconsolidated material and 1v:0.25h in rock. If, for some reason, cut slopes are less than 1v:3h, they would be dressed to aid in establishing vegetation and minimizing erosion. Where practical, roads would be located to avoid excessive cuts and fills.

Embankments would be located on stable slopes. All vegetation and suitable topsoil would be removed prior to placing fill on the embankment areas. Only suitable material would be used in constructing the embankments to enhance stability. The embankments would be built in compacted layers. The layer thickness and amount of compaction would be specified by a geotechnical engineer contracted to evaluate the soil conditions. To ensure an adequate bank compaction, each layer's density would be tested for acceptance prior to placement of the next layer.

Only embankments constructed with large amounts of fill would require a structural soil-foundation analysis. Specific site and soil conditions would determine the design and construction parameters used.

Embankment slopes would not be steeper than 1v:2h except where the embankment material is a minimum of 85-percent rock. Slopes for this type would not be steeper than 1v:1.35h. In all cases, the minimum safety factor for all embankments would be at least 1.25.

Crowning of the road would ensure that water drains off it. The road would be crowned at a minimum rate of 0.25 inch per foot of surface width as measured from the centerline of the road or as necessary to assure the safety of men and machinery.

Temporary erosion controls would be utilized when necessary during construction of the haul road. Owing to the lack of rainfall in the area, erosion controls would be confined for the most part to areas where construction occurs in the bottom of drainages.

Haul-road drainage structures would be designed, constructed, and maintained to safely pass the peak runoff from a 10-year, 24-hour precipitation event. Ditches would be provided as required along cuts and at cut-and-fill sections. The ditches would contain only road-water runoff and would not require sedimentation structures. Ditches would be cleaned as a matter of routine road maintenance.

Culverts would be used unless design conditions or other factors dictate otherwise. A culvert would be placed at each location where the drainages intersect the haul road. The inlet and outlet of the culverts located at the major drainages would be riprapped. Each culvert would be designed to withstand the dead load and live surcharge loads imposed on it. To ensure that the design strength of the culvert is developed, selected fill material would be placed in lifts around the culvert and compacted. The amount of compaction required and the thickness of the lifts would be specified by the geotechnical engineer. Additional lifts would not be placed around the culvert until the design density is achieved.

The proposed haul road would cross the La Plata River, New Mexico State Highway 170, a private gravel road, Shumway Arroyo, and the Hutch Canyon diversion. The following structures would be required to accommodate the crossings: (1) bridges at the La Plata River, Shumway Arroyo, and the Hutch Canyon diversion; (2) an overpass at New Mexico State Highway 170; and (3) an at-grade crossing for the private road. The at-grade crossing would be designed and constructed in accordance with industrial standards; the design and construction would comply with applicable State and Federal safety regulations.

The bridges would be designed and constructed in accordance with industrial design standards. Each bridge would be designed to withstand the maximum expected vehicle load and to safely discharge the estimated peak flow for a 25-year, 24-hour precipitation event. SJCC would obtain a Nationwide Permit for minor road-crossing fills from the Corps of Engineers for constructing the bridges over the La Plata River; construction of the bridges over Shumway Arroyo and the Hutch Canyon diversion do not require a permit.

An overpass would be used to cross New Mexico State Highway 170. This would reduce traffic hazards and disruption of public traffic on the highway. To ensure the safety of public traffic on State Highway 170, the design of the overpass would be coordinated with the State Highway Department. The overpass would be designed to safely handle the maximum expected traffic volume and loaded vehicle weight.

The haul road would be fenced on both sides to minimize livestock wandering onto the haul road. Where the proposed haul road splits a grazing unit pasture or rangeland that cannot be adequately separated into two grazing units, livestock movement would be allowed by 96-inch (8-foot) minimum-diameter culverts beneath the haul road. Where a split grazing unit can be separated into two or more grazing units, livestock crossing would be handled by use of gates in the fenced haul road.

Prior to construction, the landowners, the BLM grazing permittees, and SJCC would agree upon the location of the livestock crossings. The installation procedures outlined previously for drainage culverts would be followed. These crossing would also accommodate the movement of wildlife.

The following pavement structure would be used for the proposed haul road:

Chip-seal surface	1 inch
Base (3/4-inch, aggregated)	6 inches
Subbase (1-1/2-inch, aggregated)	30 inches
Total thickness of pavement structures	37 inches

The thickness of the base and subbase material is based on standard highway design but increased slightly to offset the nonstandard highway surface (chip-seal) used. A chip-sealed haul-road surface has been utilized at the Navajo mine and has proven very successful. The chip-seal surface would not be applied until the second year of operation to allow for adequate settlement in the underlying surface structure and road base. This stabilizing period greatly reduces the surface maintenance required in the future.

During the first 2 years, prior to applying the chip-seal, the haul road would be watered regularly to control the fugitive dust produced by the haul trucks on the nonpaved haul road.

All coal haul roads at the mine would receive regular maintenance. This maintenance would include, but would not be limited to, regularly scheduled watering for dust suppression; blading, scarifying, replacement of gravel, and recompaction to maintain road-bed stability; and maintenance of drainage structures. Haul roads would be inspected regularly during coal-haulage periods to ensure adequate maintenance.

Portions of haul roads damaged by events such as floods or earthquakes would not be used for hauling coal until the road has been repaired. Reconstruction would be completed as soon as practical.

When mining at the La Plata mine terminates or when the haul road and related structures are no longer required, they would be removed and the affected area reclaimed as follows:

- All bridges and culverts would be removed.
- The natural drainage would be restored unless reestablishment would not enhance environmental values.
- The road-surface material would be hauled to mine pits and covered. The subbase would be left in place.
- The road bed would be ripped, plowed, and scarified.
- Fill slopes would be ripped and rounded or reduced and shaped to conform the site to adjacent terrain and to meet natural drainage restoration standards.
- Cut clopes would be shaped to blend with the natural contour.
- Cross drains, dikes, and water bars would be constructed to minimize erosion.
- Terraces would be constructed as necessary to prevent excessive erosion and to provide long-term stability in cut-and-fill slopes.
- The surface would be covered with topdressing and revegetated according to the reclamation plan.

D. RECLAMATION

SJCC is committed to the successful reclamation of all areas disturbed during coal mining and related activities. It is the objective of SJCC to establish a diverse, effective, and permanent vegetative community of the same seasonal variation native to the La Plata mine area. Final vegetative productivity and cover are designed to be compatible with the postmine land use of livestock grazing and wildlife habitat. The vegetative cover would be as capable of stabilizing the soil surface from erosion under proper management practices as is the present cover. The revegetation seed mixture would consist of a variety of cool- and warm-season grass species as well as an assortment of forbs, shrubs, and trees where applicable.

Topdressing analysis and removal and spoil placement would be year-long operations. Topdressing analysis and removal would be concentrated in those areas immediately ahead of drill and blast operations in preparation for overburden removal. A 300-foot buffer zone would be maintained between the active spoil area and reclamation activities to ensure that mining and reclamation activities do not interfere with each other.

Coal seams below the mineable depth would be backfilled and covered as part of the mining process. While in most cases unmined coal seams would be buried quite deeply, in all cases they would be covered with a minimum of 4 feet of noncombustible material. The chemical composition and geological structure of the overburden and interburden of the La Plata mine area indicate no toxic or acid-forming materials are present. Hence, acid- or toxic-forming materials would not be generated by mining operations at the La Plata mine.

Prior to topdressing replacement, a road grader, dozer, or similarly effective piece of equipment would be used as necessary to complete final dressing on recontoured slopes. Final spoil dressing would be along the contour wherever possible to minimize slippage surfaces and reduce erosion.

Topdressing redistribution would follow grading operations once the spoil area is graded to final slope. Topsoil would be removed from stockpiles or directly from topsoil salvage areas and redistributed on recontoured areas prior to revegetation. An average depth of 10 and 6 inches of topdressing would be redistributed over the Sundance and Younger pits, respectively. When practicable, topsoil would be transported directly from areas being salvaged. Traffic on replaced topsoil would be limited to reclamation activities to minimize compaction of topsoil materials.

Depth of redistributed topsoil would be monitored during the redistribution process and a final check would be made once redistribution is complete to assure adequate coverage. Redistributed topsoil would be chemically analyzed only if there is a problem in seed germination and establishment or if a problem is suspected during topsoil depth sampling. Appropriate chemical analyses would be made to define the problem and assist with the development of mitigative measures.

Once in place, all topdressing would be scarified to alleviate soil compaction, break the topdressing-spoil interface, and promote root penetration. All discing and plowing would be done along the contour when practicable to help control wind and water erosion.

Seeding would take place during the first normal period for favorable planting. Climatological records indicate that about one-half of the normal rainfall generally occurs during the months of July, August, September, and October. To maximize the advantage of this "wet" season, seeding would generally be done in July-August.

In general, the species selected for revegetating the La Plata mine study area are the dominant native plant species showing desirable characteristics for seed availability, viability, revegetative capability, palatability, provision of cover, and/or erosion control.

The seed mix and resulting vegetation community must provide for postmine land uses of domestic livestock grazing and wildlife habitat. A balance between these uses would be accomplished by planting a grass-forb-shrub seed mix on all disturbed areas and containerized or transplanted shrub and tree species along the recreated drainages and in clumps scattered throughout the reclaimed area.

Table A-2 lists species and respective seeding rates that would be used at the La Plata mine, subject to seed availability. The quantities of pure live seed per acre would vary somewhat depending on seed supply.

To the greatest extent possible, seeding would be done with the disc-type drill that is capable of handling the fluffy type of seed typical of range species. There would be a minimum of two seed boxes to accommodate various seed sizes. Drill rows would be 8 to 12 inches apart. All seeding would be done on the contour wherever possible. Broadcast seeding would be done only where it is impractical to utilize the drill. If broadcast seeding is practiced, the seeding rate would be doubled.

In addition, containerized or transplanted shrubs and trees would be planted along the reestablished drainages and in irregularly shaped clumps on upland sites. The shrub islands would be located in a manner to allow deer to forage in the more open seeded areas and still have cover from visibility. The containerized species would be planted at a density of about 600 per acre. The species to be used and their approximate number per acre are shown in table A-3. The containerized seedlings would be planted in accordance with recommended procedures by the nursery. Each plant would be watered at the time of planting as needed to ensure its survival.

The following fertilization practices would be used at the La Plata mine:

- Ninety pounds per acre of phosphate would be broadcast on the spoil immediately prior to topdressing replacement. This placement would enhance phosphorous uptake by plant roots.
- Sixty-eight pounds per acre of nitrogen would be added to the topdressing when seeding in the form of 200 pounds of 34-0-0, or the equivalent. Nitrogen would be placed on the soil surface due to its general mobility through the soil profile.

Native grass mulch, if available, or straw mulch would be applied immediately following seeding operations at a rate of approximately 2 tons per acre. The mulch would be applied with a blower and mechanically crimped to minimize wind loss.

It is not anticipated that supplemental irrigation would be needed at the La Plata mine. Seeding dates would coincide with expected normal late summer rains.

Fencing of reclaimed acreage would be on an as-needed basis. Domestic livestock would be excluded from mining and reclamation areas by temporary

Table A-2.--Seed mix for revegetation at the proposed La Plata mine

(Data furnished by applicant)

Species	Number of seeds per pound	Pounds pure live seed/acre	Number of seeds per square foot
Alkali sacaton	1,750,000	.05	2
Blue grama	712,000	.25	4
Galleta	400,000	.5	4
Indian ricegrass	235,000	.75	4
Sand dropseed	5,298,000	.05	6
Sideoats grama	143,000	.5	3
Spike muhly	1,635,000	.05	2
Western wheatgrass	110,000	1.0	2
Aster	750,000	.1	2
Eriogonum	250,000	.5	3
Globemallow	250,000	.5	3
Penstemon	280,000	.5	3
Antelope bitterbrush	20,000	2.0	1
Cliffrose	65,000	.75	1
Fourwing saltbush	30,000	1.5	1
Mountain mahogany	40,000	1.0	1
New Mexico olive	32,000	1.5	1
Serviceberry	82,000	.5	1
Skunkbush sumac	8,000	2.0	1
Shadscale	50,000	1.0	1
Winterfat	150,000	.25	1
Total		15.25	47

Table A-3.--Tree and shrub species for revegetation at the proposed La Plata mine

(Data furnished by applicant)

Species	Approximate number of plants per acre
Antelope bitterbrush	100
Cliffrose	20
Fourwing saltbush	20
Mormon tea	20
Mountain mahogany	100
New Mexico olive	20
Pinyon	20
Serviceberry	100
Shadscale	20
Skunkbush sumac	100
Snowberry	20
Utah juniper	40
Winterfat	20
Total	600

fencing outside the disturbed areas. Wildlife species, especially deer and rabbits, would be excluded from reclaimed areas only if they are damaging the reclaimed areas. In such cases, repellents, either mechanical or chemical, would be utilized in lieu of fencing. Wildlife-proof fence (i.e., 8-foot woven wire) would only be used as a last resort. As soon as practicable following mining, reclamation activities, and the liability period, all fences removed prior to mining would be replaced.

Weed control would be practiced sparingly at the La Plata mine on reclamation areas to avoid overreaction to what should be considered a natural phenomenon. Newly disturbed areas can be expected to have annual weeds during the first few years of revegetation and would gradually change to have the slower but more persistent perennial weeds. Weeds would not be sprayed until at least the second growing season after perennial grasses are seeded or shrubs transplanted and then only if noxious or toxic weeds are present and abundant enough to warrant spraying.

Pesticide would not be utilized except in extreme cases (i.e., grasshopper infestation). If a pesticide application becomes necessary, the regulatory authority would be contacted in advance.

On reclaimed areas, rills and gullies in excess of 9 inches would be stabilized and reseeded as soon as practicable for prompt reestablishment of vegetation. Stock-water ponds destroyed during mining would be replaced in suitable locations. All other surface facilities, such as office areas, haul roads, and stockpile areas, would be removed, and the surface ripped and, if necessary, graded, topsoiled, and revegetated at the end of the mine life.

E. ASSISTANCE TO THE COMMUNITY

SJCC and its parent company, Utah International, Inc. (UII), have a record of voluntary assistance to public and private organizations in Farmington and San Juan County, including:

- $17,000 contributed to Navajo education in 1982;
- $297,000 contributed to Navajos for in-house training;
- $50,000 per year contributed in the form of coal dumps for local residents; and
- Regular contributions to community welfare, youth, arts, sports, and regional education institutions.

In addition, the companies have contributed either financially or through equipment and employee time to:

- Blading of roads;
- Assistance to individual Navajos during bad weather (e.g., hauling hay in 1977);
- Building a football stadium at the Navajo Mission Academy; and

- Building a playground, track, and football field at Nenahnezad School.

UII and the New Mexico Mining Association developed and distributed the school kit "Enterprise" to all area schools. UII contributed both money and the time of the UII person who chaired the Enterprise committee. A workshop for area school teachers was jointly sponsored by UII and Consol.

In 1983, UII developed an educational video presentation and program for 7th- through 12th-grade reservation schools (1) to help motivate young people to finish high school and to acquire skills and training through higher education, (2) to acquaint these students with the experience of working for a company, and (3) to educate them with respect to the free enterprise system.

UII and SJCC plan to continue their assistance to public and private organizations in the area.

APPENDIX B

PROPOSED CONDITIONS

OSM, BLM, and New Mexico MMD have identified portions of the PAP that must be modified or clarified for the mining plan and the transportation corridor plan to comply with requirements of the New Mexico Surface Coal Mining Regulations and SMCRA. The following conditions, to which SJCC must agree, require such modification and/or clarification and would be attached to the permit if it is issued.

1. The applicant must submit a more detailed discussion of the procedures that would be used to break up the soil-spoil interface.

2. The applicant must consult with USFWS to establish appropriate buffer zones and other necessary mitigation measures to protect the ferruginous hawk nests in sec. 5, T. 30 N., R. 14 W. and secs. 13 and 27, T. 31 N., R. 14 W. All mitigation measures must be approved and completed prior to construction of the transportation corridor in the vicinity of the nests.

3. Until needed for specific project purposes, all public lands within the coal-lease or facilities area must remain open to the grazing of livestock. This use must be coordinated among the BLM Farmington Resource Area authorized officer, the grazing allottee, and an SJCC official at least 30 days prior to livestock being turned onto the allotment. Hazard areas or areas deemed unsafe for livestock grazing must be excluded.

4. If, during the course of mining operations, previously unidentified cultural resources are discovered, the applicant must ensure that the site(s) is (are) not disturbed and must notify OSM of it (them). The operator must ensure that the resource(s) is (are) properly evaluated in terms of National Register eligibility criteria (36 CFR 60.6). Should a resource be found eligible for listing in consultation with OSM, BLM, and the New Mexico SHPO, the operator must confer with and obtain the approval of these agencies concerning the development and implementation of mitigation measures.

5. Any potentially significant fossils must not be knowingly disturbed, altered, or destroyed, but must be protected in conformity with BLM policy.

APPENDIX C

DATA ON SOILS

Table C-1.--Soil map units and salvage data

Map unit symbol	Map units and percent composition	Slope (percent)	Parent material and setting
At	Atrac-Atrac Variant complex: 50 percent Atrac DSCL[1] 35 percent Atrac Variant DL 15 percent Buckle-Silver-Silver Variant DC, DL, DCL, DSCL, DSL	0 to 3	Alluvium derived from sandstone and shale, located on terraces and alluvial fans.
Bu	Buckle-Silver-Silver Variant: 45 percent Buckle DC 20 percent Silver DC (gravelly) 20 percent Silver Variant DCL 15 percent Atrac, Glenberg DSCL, DSL	0 to 8	Alluvium derived from sandstone and shale, located on upland valleys and alluvial fans.
DN	Doak-Avalon complex: 50 percent Doak DL 35 percent Avalon DL 15 percent Mayqueen, Sheppard, Shiprock, Shiprock Variant DFSL, DLFS, DFS	0 to 5	Loamy and sandy loam alluvial soils derived from sandstone and shale, located on mesas, plateaus, and terraces.
HA	Haplargids-Blackston Torriorthents complex: 45 percent Haplargids Sw to D cobbly SL 30 percent Blackston DL (gravelly) 20 percent Torriorthents Sw to DL (cobbly) 5 percent rock outcrop	8 to 50	Cobbly and gravelly alluvium, rock outcrop, and shale, located on upland valleys, terraces, and plateaus.
NO	Notal Variant: 100 percent Notal Variant DSCL (C and CL below 3 inches)	0 to 5	Fine-textured alluvium derived from sandstone and shale, located in upland valleys.
Ro	Rock outcrop		
Ta	Travessilla Variant-Canyon-Mion complex: 35 percent Travessilla Variant VSwSCL (gravelly) 30 percent Canyon SwL (20 to 50 percent gravel at 3- to 9-inch depth and 50 to 60 percent gravel at 9 to 20 inches) 20 percent Mion SwSCL (gravelly and channery) 15 percent rock outcrop, Harvey Ro and DCL (first 2 inches SL)	3 to 40	Colluvial sediments and residuum derived from sandstone, located on hilly uplands, breaks, and mesas.

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[1] Depth: D = deep, more than 40 inches; Sw = shallow, 10 to 20 inches; VSw = very shallow, less than 10 inches; Ro = rock outcrop. Texture: C = clay; CL = clay loam; L = loam; SCL = sandy clay loam; SL = sandy loam; FSL = fine sandy loam; LFS - loamy fine sand; FS = fine sand.

Table C-1.--Soil map units and salvage data--Continued

Map unit symbol	Reclamation inhibitory factors	Topsoil suitability	Salvageable depth (inches)
At	High SAR below 10 inches on Atrac and below 26 inches on Atrac Variant.	Atrac: good up to 10-inch depth. Atrac Variant: good up to 26-inch depth.	22
Bu	Buckle: saline and gravelly below 23 inches; fine textured throughout. Silver: gravel layers and fine textured below 32 inches. Silver Variant: high SAR, fine texture, gravel. Atrac: high SAR below 26 inches. Glenberg: high SAR below 34 inches.	Buckle: fair. Silver: good up to 14 inches; fair between 14 and 60-inch depth. Silver Variant: unsuitable. Atrac: good up to 10-inch depth. Glenberg: good up to 27-inch depth.	26
DN	Coarse-textured surfaces on inclusions.	Good except for coarse-textured inclusions.	16
HA	Haplargids: cobbly. Blackston: gravelly. Torriorthents: cobbly and shale at 15 inches. Rock outcrop: rock.	Haplargids: unsuitable. Blackston: may be suitable in some cases. Torriorthents: unsuitable. Rock outcrop: unsuitable.	27
NO	Fine-textured clay to clay loam above 49 inches; bedrock fragments below 49 inches.	Good to fair, depending on texture in strata.	31
Ro		Unsuitable.	0
Ta	Travessilla Variant: sandstone bedrock at 6 inches. Canyon: gravelly layers 20 inches to sandstone bedrock. Mion: moderately fine and coarse textures; unconsolidated parent material at 12 inches. Rock outcrop, Harvey: Ro and moderately fine texture, high lime, hard consistency.	Travessilla Variant: good to fair to 6-inch depth. Canyon: good to fair at 0- to 9-inch depth. Mion: fair up to 12-inch depth. Rock outcrop: unsuitable. Harvey: good to fair up to 48-inch depth.	6

Table C-1.--Soil map units and salvage data--Continued

Map unit symbol	Younger pit		Sundance pit		Facilities area	
	Salvageable depth (inches)	Bank cubic yards	Salvageable depth (inches)	Bank cubic yards	Salvageable depth (inches)	Bank cubic yards
At	7	20,700	7	20,700	---	---
Bu	3	10,500	160	559,300	---	---
DN	---	---	90	193,600	45	96,800
HA	---	---	1	3,600	---	---
NO	---	---	74	308,400	---	---
Ro	---	---	0	---	---	---
Ta	231	186,340	927	747,800	---	---
Total	241	217,540	1,259	1,833,400	45	96,800

APPENDIX D

CORRESPONDENCE CONCERNING PRIME FARMLANDS

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE 424 N. Mesa Verde; Aztec, NM 87410

May 6, 1982

San Juan Coal
Box 561
Waterflow, NM 87421

Gentlemen:

I have reviewed the proposed transportation corridor located within the bounds of: T32N, R13W, Sections 21,22, 28, 29, 32, 33; T31N, R13W, Sections 4, 5, 6, 7, 8, 9, 18; T30N, R14W, Sections 5, 6, 7; T30N, R15W, Sections 12, 13, 14, 23; Ute Reservation, T31N, R14W and have made the following determinations; except for the irrigated portions of various sections which your proposed location does not impact:

1. The sections mentioned contain no Prime or Unique farmlands;

2. These areas contain no alluvial valley floors. They are upland sites with no potential for sub-irrigation or flood irrigation and do not contain any unconsolidated stream laid deposits of significant size. The areas contain only small, minor, intermittent drainages.

The area in question is best described as arid rangelands with rainfall of less than 10 inches per year; therefore the potential for farmland is nil and runoff amounts are small.

I hope this information is of value to you.

Sincerely,

Steven P. Neville
District Conservationist

SPN:pc

Attachment 20-1

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

424 N. Mesa Verde
Aztec, NM 87410

November 3, 1982

RECEIVED
NOV
SAN JUAN CO

San Juan Coal
P. O. Box 561
Waterflow, NM 87421

Gentlemen:

At the request of Fred Samson of your company, I have reviewed the soils for T32N, R12W, Sections 7, 8, 17, 18, and T32N, R13W, Sections 13, 14, 15, 21, 22, 23, 27, and 28.

It is my determination that, except for irrigated portions of T32N, R13W, Sections 15, 22, and 27, no prime farmlands exist on the proposed mining area.

Climatic factors, in the absence of legal and feasible irrigation, along with soil limitations, preclude the production of farm comodities.

If we can be of further service, please call.

Sincerely,

Steven P. Neville
District Conservationist

pc

APPENDIX E

CORRESPONDENCE CONCERNING THE ANIMAS-LA PLATA PROJECT

United States Department of the Interior
BUREAU OF RECLAMATION
UPPER COLORADO REGION
DURANGO PROJECTS OFFICE
P.O. BOX 640
DURANGO, COLORADO 81301

AUG 29 1983

IN REPLY REFER TO: 700
160.

OSM-WTC
1983 AUG 31 AM 11:5[illegible]
WESTERN TECHNICAL CENTER

Memorandum

To: Office of Surface Mining, Denver, Colorado
Attention: Mr. Charles Albrecht

From: Acting Projects Manager, Durango Projects Office

Subject: Environmental Impact Statement for La Plata Mine, Proximity to Features of the Proposed Animas-La Plata Project, Colorado-New Mexico

This memorandum discusses proposed features of the Animas-La Plata Project that would be located in the vicinity of the La Plata Mine area. Also discussed is the potential conflicts between the Animas-La Plata Project features and the mining activities, and some alternatives that have been considered to minimize the conflicts. This information is being provided for use in the Environmental Impact Statement being prepared for the La Plata Mine.

The features serving the New Mexico portion of the Animas-La Plata Project near the La Plata Mine include:

1. Southern Ute Dam and Reservoir
2. New Mexico Irrigation Canal
3. Third Terrace Pumping Plant
4. La Plata, New Mexico Laterals

The proposed Southern Ute Dam is located on Cinder Gulch in Section 7, T32N, R12W and Sections 12 and 13, T32N, R13W. It would be a rolled earth and rockfill structure containing about 2,640,000 cubic yards (cy) of selected materials. The height of the dam above Cinder Gulch would be about 170 feet and the dam would have a crest length of about 2,900 feet. The reservoir behind Southern Ute Dam would have a surface area of 1,386 acres when full, with a total capacity of 70,000 acre-feet (AF). It would store municipal and industrial water for the Southern Ute Indian Tribe and irrigation water for about 8,250 acres of irrigable land in New Mexico. The dam, as shown on the enclosed map, would be located partially within the mine lease area.

A major concern regarding the safety of the proposed Southern Ute Dam site is the magnitude of ground vibrations generated by the blasting program at the La Plata Mine. Utah International contracted with White Engineering & Associates, Inc. to examine the effects of blasting near the dam site. Their study, summarized in a November 1982 report, employed a computer simulation technique to predict the probable amplitude and frequency characteristics of seismic ground vibrations arriving at the dam site. The simulated measurements for 100 hole shots indicate displacements up to 0.40 inches at distances of 1000 feet from the blasts. However, the one tenth "g" acceleration limit suggested for earth dams was not exceeded. The report concluded that standard mining procedures could probably be used up to about 1000 feet from the dam site. With minor modifications to mining procedures, mining could probably come within 500 feet of the dam site without exceeding the one tenth "g" acceleration limit.

Seepage from the proposed reservoir should not greatly affect the mining procedures at La Plata Mine. Mine drilling data indicates a relatively high water table in the coal seams of the area. The impoundment of the reservoir should not significantly affect this ground water table because none of the coal seams outcrop in the reservoir area.

Recreation at Southern Ute Reservoir is designed for a maximum of 920 people at one time. The close proximity of the La Plata Coal Mine may impact recreational activities because of noise, dust and the disturbed landscape. The impacts would be reduced as the mining progressed away from the reservoir area.

The New Mexico Irrigation Canal would extend south and west from Southern Ute Dam for 3.1 miles to the Third Terrace Pumping Plant. This would be an earth-lined canal with a maximum capacity of 140 cubic feet per second (cfs). The present alignment of the canal is within the lease area for almost the entire length, as shown on the map. The Bureau did look at a number of different options for moving the canal out of the lease area or at least away from the area to be actually mined. Our alternatives were evaluated based on the mining plan that was proposed in the early part of 1982. Mining plans have probably changed since that time and the suitability of these alternatives may have been affected. The three alternatives were:

1. Alternative #1 - Routing the entire canal north of the lease area.

2. Alternative #2 - Leaving most of the canal where it is presently proposed, moving only sections that were within the actual area to be mined.

3. Alternative #3 - Routing the canal south of the lease area.

Alternative #2 was the least expensive, but its feasibility would depend on the final mining plan, the actual schedules for mining and for constructing the canal, and the changes in topography that may result from mining.

The Third Terrace Pumping Plant would be located at the western end of the New Mexico Irrigation Canal. It would pump water up about 137 feet into an elevated steel tank to provide 30 cfs of pressurized water for 1,874 acres of land in New Mexico. The pumping plant would be located within the lease area and very near the area proposed for mining. The plant location would change if an alternative location were chosen for the New Mexico Irrigation Canal. Depending on the final location of the pumping plant, some parts of the pipe distribution system of the La Plata, New Mexico Laterals may have to be relocated from where they are presently proposed. This should not be a big problem and would not be likely to result in any significant cost increases.

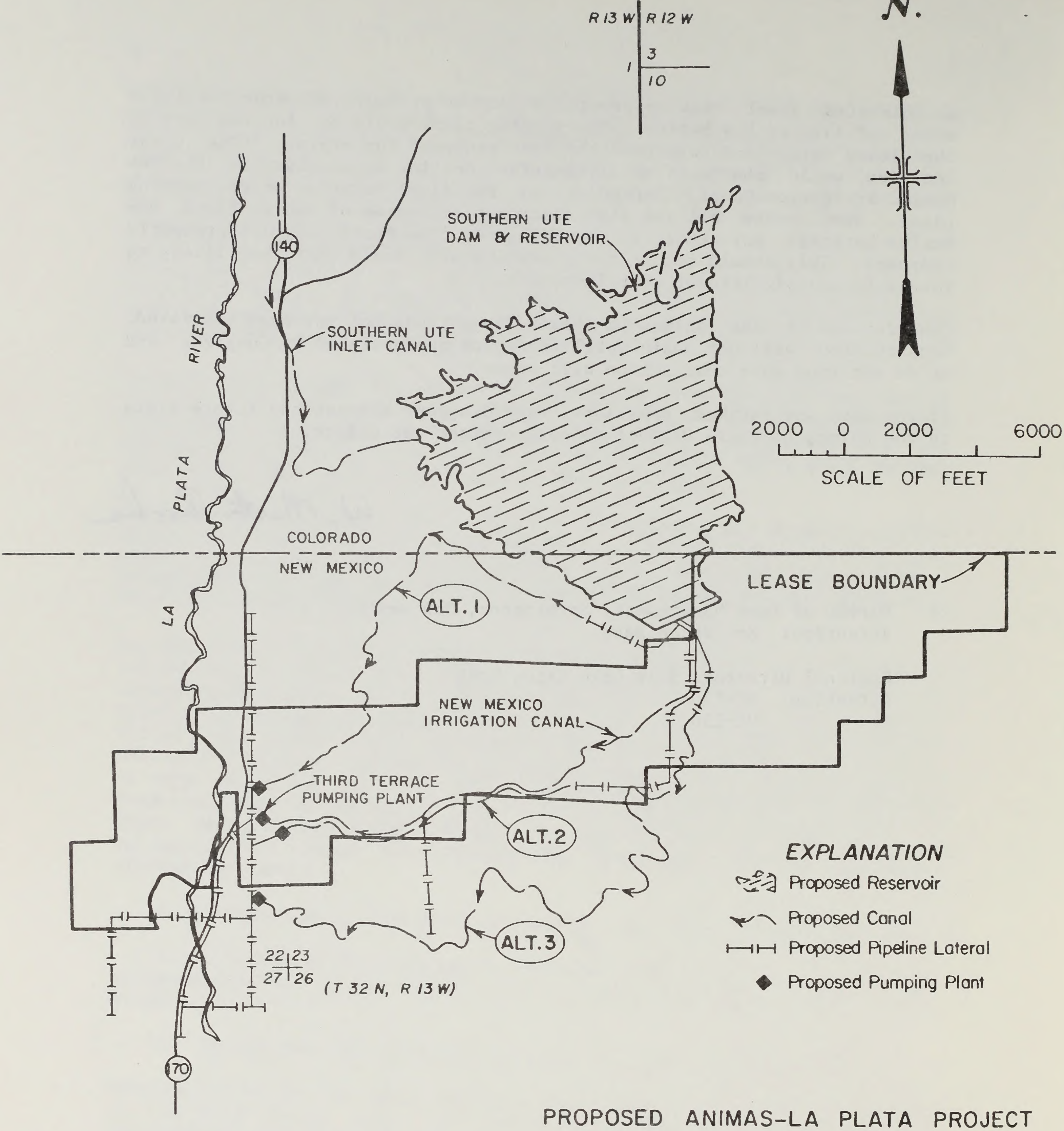
Construction of the Animas-La Plata Project has not yet been initiated. Construction will not begin until funds are appropriated by Congress and we do not know when that action will occur.

If you have any further questions regarding our present and future plans on the Animas-La Plata Project, please contact our office.

W. Martin Roche

cc: Bureau of Land Management, Farmington, New Mexico
Attention: Mr. Bruce Bash

Regional Director, Salt Lake City, Utah
Attention: UC-150
UC-250



PROPOSED ANIMAS-LA PLATA PROJECT
PROXIMITY TO LA PLATA MINE

United States Department of the Interior

BUREAU OF RECLAMATION
UPPER COLORADO REGIONAL OFFICE
P.O. BOX 11568
SALT LAKE CITY, UTAH 84147

IN REPLY REFER TO: UC-150

120.1

AUG 16 1984

Mr. William G. Weist, Jr.
Senior Project Manager
Office of Surface Mining
Reclamation and Enforcement
Brooks Towers
1020-15th Street
Denver, Colorado 80202

Dear Mr. Weist:

We have reviewed the Draft Environmental Impact Statement on the proposed La Plata Mine, and we are satisfied with the treatment of the impacts on the Bureau of Reclamation's proposed Animas-La Plata Project.

References to the Animas-La Plata Project should note that the earliest possible date for construction to begin would be 1986 and would depend upon congressional funding. The Southern Ute Dam, New Mexico Irrigation Canal, and associated features that would be directly impacted by the La Plata Mine are scheduled to be built late in the construction of the project. Construction on these features would probably begin five to seven years after funding for the project is initiated. The alinement of these features will depend upon the status of reclamation of the La Plata Mine, and would be negotiated prior to final design after funding is secured.

We appreciate the opportunity to review the Draft Environmental Impact Statement, and we shall be glad to help address any questions or comments about possible impacts between the La Plata Mine and the Animas-La Plata Project.

Sincerely yours,

Clifford I. Barrett
Regional Director

APPENDIX F

CORRESPONDENCE CONCERNING WILDLIFE

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE

Field Supervisor
Ecological Services, USFWS
Post Office Box 4487
Albuquerque, New Mexico 87196

Cons. #2-22-83-F-026

December 14, 1983

Memorandum

To: Mr. Robert Schueneman, Chief, Technical Support Branch, Office of Surface Mining, Denver, Colorado

From: Field Supervisor, FWS, Ecological Services, Albuquerque, New Mexico

Subject: Biological Opinion for La Plata Mine, San Juan County, New Mexico (OSM)

This is in response to your request of November 3, 1983 for formal Section 7 consultation, as provided by the Endangered Species Act, on your approval of a permit request by San Juan Coal Company (SJCC) to operate a surface mine in northern San Juan County, New Mexico.

The following background information and biological opinion are founded upon information furnished by the Office of Surface Mining (OSM), data in our files, and discussions with OSM personnel. The proposed actions may affect the bald eagle (Haliaeatus leucocephalus) and the black-footed ferret (Mustela nigripes).

PROPOSED ACTION AND BACKGROUND INFORMATION

The proposed action is the approval of a permit request from SJCC to operate a surface mine in an area in northern San Juan County, New Mexico. The permit area is approximately 2,800 acres in size and is situated east of the La Plata River 16 miles north of Farmington. During the estimated 35-year life of the mine, approximately 2200 acres would be disturbed. About 1700 acres of this would be disturbed and reclaimed in parcels while the remainder would be needed for project facilities and a transportation corridor.

OSM-WTC
1983 DEC 19 AM 10:10
WESTERN TECHNICAL CENTER

ASSESSMENT OF IMPACTS

Bald Eagle

The bald eagle was listed as endangered on February 14, 1978 (43 FR 6233). Reasons for decline of this species include habitat loss, pesticide-induced reproductive failure and human disturbance. The bald eagle primarily utilizes aquatic habitats in the San Juan Basin during the winter period, November through February. Significant winter use occurs mainly at Navajo Reservoir and on the Animas River.

Other aquatic habitats such as the San Juan and La Plata Rivers, adjacent wetlands and open water areas are also used for foraging, resting and roosting. The applicant's 1982 survey documented a minimum of six bald eagles which were frequently observed in cottonwood trees along the La Plata River. In addition to the cottonwoods, the sandstone hills east of Highway 170 and within SJCC's permit boundary are also used by the bald eagle. The bald eagle is known to range widely while foraging. Therefore, it is reasonable to expect this species to use other portions of the La Plata mine permit area.

The two areas of greatest concern are the roost along the La Plata River, T32N, R13W the SW1/4 of Section 15 and the sandstone hills used for daytime perching in Section 14 and 15 where Highway 170 crosses the northern permit boundary. Surface disturbance in this area will not occur west of Highway 170 but there will be a pit, a haul road and a topsoil stockpile just east of the highway.

In addition to disturbances caused by traffic on Highway 170 and routine human activities from nearby agricultural operations, the mine will present new disturbances. The haul road will be approximately 1800 feet east of the La Plata roost so there will be the regular movement, noise and dust from coal trucks and other equipment. While most of the coal hauling will occur during the day, activities during the night are expected as well. During mining and site recovery, there will be periodic daytime blasting in the pit just east of this haul road. These disturbances may cause the bald eagles to roost further north or south along the La Plata River, or to abandon this winter roost site altogether and move to another area.

The displacement of some bald eagles from mine development areas and the transportation corridor across the La Plata River may have an adverse impact on the bald eagle. Riparian areas disturbed by these activities, especially along the La Plata River, should be replanted with cottonwoods, shrubs and ground cover of benefit to wildlife. This practice would also protect water quality, and prevent erosion.

The daytime perch area will be much closer to these mine disturbances. At its closest point the haulroad will be only 600 feet from the perch area. It is possible that the eagles will choose to perch elsewhere in response to blasting overburden removal and coal hauling activities. As parcels of habitat are disturbed the total number of acres within the eagles' foraging area will be reduced. However, bald eagles subsist to a greater extent on aquatic associated prey. Therefore, the short-term loss of parcels of inland foraging area should have little significant impact on this species. There is no documented feeding area within the permit area and the reclamation plan will restore features capable of supporting potential eagle prey. While perches do not appear to be limiting, power lines associated with the mine will be safe for raptor use. Therefore, the Service concludes that the effect of this project on the bald eagle population would be negligible.

Black-footed Ferret

The black-footed ferret was listed as endangered on March 11, 1967 (32 FR 4001). Reasons for its decline include habitat loss and prairie dog control programs. While no recent, verified sightings of black-footed ferrets have been made in New Mexico, there is the potential that the ferret may exist in northwestern, New Mexico. Recent discoveries of black-footed ferrets in Wyoming during fall of 1981 and throughout 1982 give added impetus to requiring surveys for ferrets. Potential habitat for ferrets in northwestern New Mexico is considered to be prairie dog towns.

Mariah Associates, Inc. conducted ferret surveys along the proposed transportation corridor and in the proposed mine area. Although no prairie dog towns are located within the project site, one prairie dog town is adjacent to the southern boundary of the permit area. The consultant used methodologies currently recommended by FWS to search the prairie dog concentrations for ferrets and ferret sign. A total of 1,341 acres of prairie dog towns were searched using 15.1 person days during daylight and 58.4 person hours during spotlight surveys.

Potential ferret signs were reported, including three soil stringers, two punctured prairie dog skulls, and a scat. Although a resurvey of the area is anticipated in 1984, no black-footed ferrets were observed during this study or known from the study areas. Therefore, the Service concludes that this proposed project will not have an adverse impact on the black-footed ferret population.

BIOLOGICAL OPINION

Based upon this evaluation, it is my biological opinion that the proposed actions are not likely to jeopardize the continued existence of the bald eagle or the black-footed ferret.

Further consultation is not required unless new information becomes available that discusses the welfare of the bald eagle or black-footed ferret, new species are listed that may be affected by these actions, or project actions are modified in a manner not considered by this opinion.

Sincerely yours,

Field Supervisor

cc:
Director, New Mexico Department of Game and Fish, Santa Fe, New Mexico
Utah International, Inc., Fruitland, New Mexico
Director, FWS, Washington, D. C.
Regional Director, FWS, HR and SE, Albuquerque, New Mexico

Bureau of Land Management
Library
Bldg. 50, Denver Federal Center
Denver, CO 80225